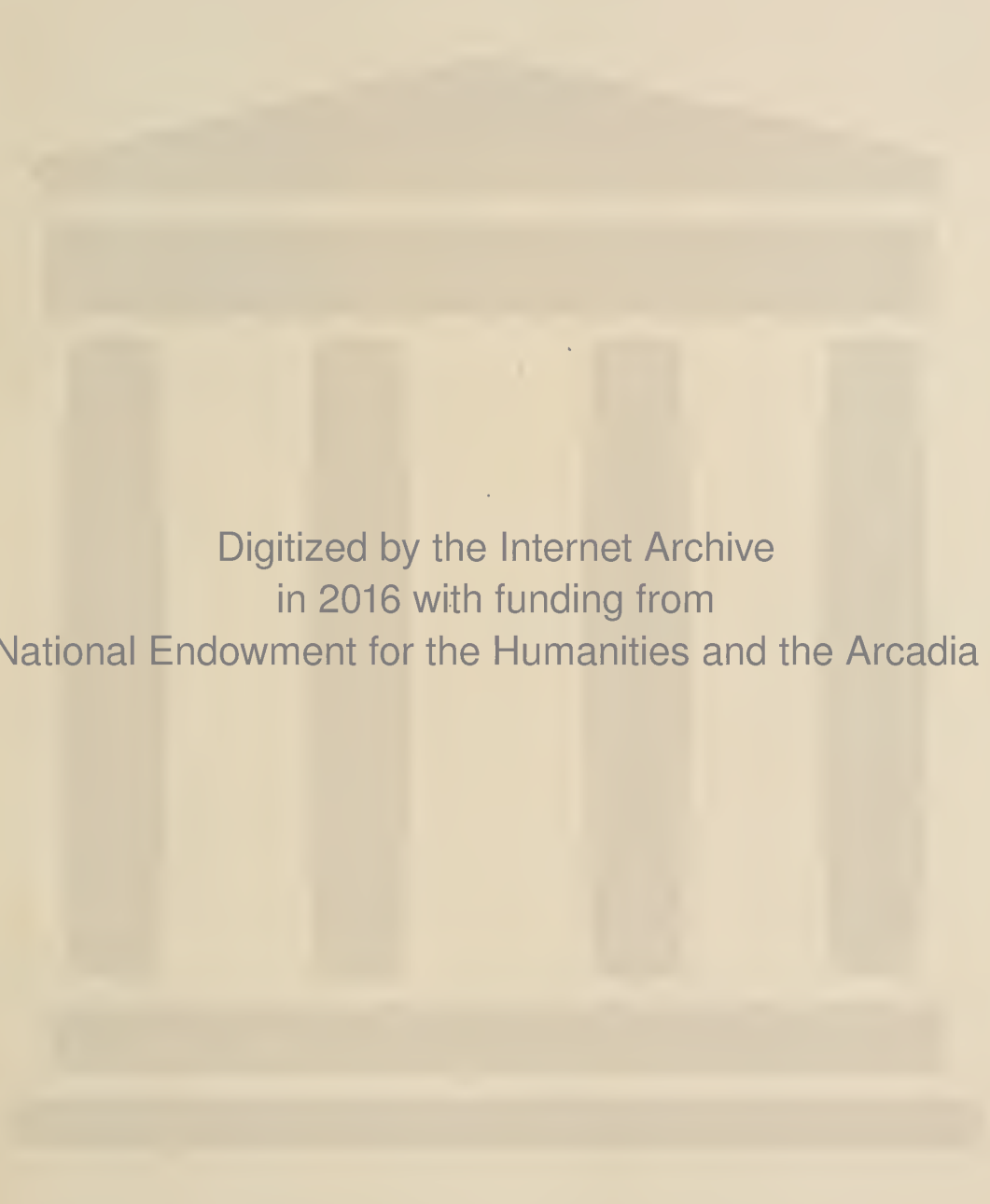


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HAWAII MEDICAL JOURNAL

VOLUME 2

SEPTEMBER-OCTOBER, 1942

NUMBER 1

THE N.Y. ACADEMY
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DISPOSITION OF WAR CASUALTIES

A SYMPOSIUM

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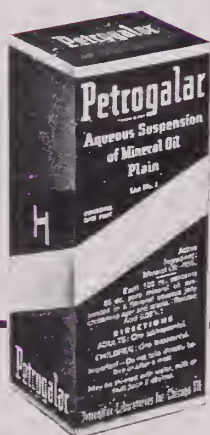
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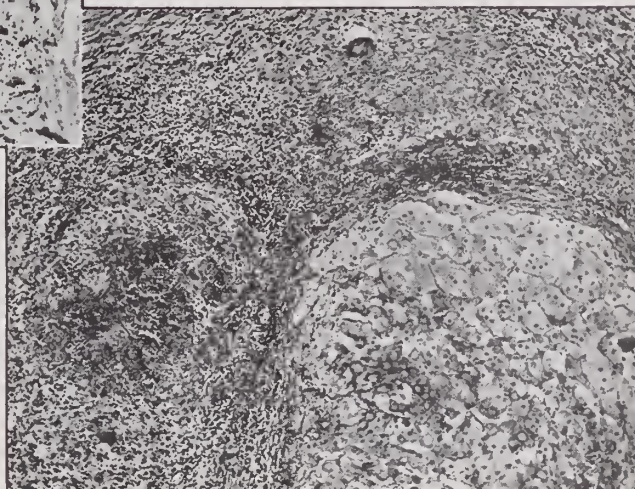


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EDITORIALS

SYMPOSIUM - WAR CASUALTIES

This issue of the JOURNAL is being devoted entirely to papers delivered at the 1942 meeting of the Hawaii Territorial Medical Association—a Symposium on the Disposition of War Casualties. The usual feature columns are omitted from this number; they will appear again as usual in the November-December issue.

This symposium was planned as a collective review of experiences in war surgery as practised by those who were active in the Navy and Army hospitals of Oahu on December 7 and subsequently. From this vantage point of several months we hoped to look back critically on our early work and to crystallize our ideas. We hoped that the new arrivals in the armed medical services, whose war experience did not extend back to the attack on December 7, would profit by these reports.

The authors and their discussants were carefully chosen from among those present and active on December 7 so that only first-hand experiences would be reported. The Program Committee is greatly indebted to the Army and Navy medical services for their ready cooperation in making this program possible, and to Lt. Comdr. A. T. Walker for ably conducting and coordinating the panel discussion. Proof of the interest in the program was the record attendance of some 325 physicians, members of the Association and of the Medical Corps of the Army and Navy, the latter easily identified by uniforms, gas masks, "tin hats," and in some instances, sidearms.

The papers and statements appearing in this issue of the HAWAII MEDICAL JOURNAL are those of the authors, in their unofficial capacity as physicians and surgeons, and are not to be construed as official

or as reflecting the views of the Navy Department or the War Department or any branch or subdivision thereof.

FIRST ANNIVERSARY

It is just a year since the Bulletin of the Hawaii Territorial Medical Association became the HAWAII MEDICAL JOURNAL. It is a good time to take stock of how nearly we have come to justifying our existence, and of how we may in the future improve over past performances.

A medical journal published in a relatively remote locality like Hawaii must serve two primary purposes: first, that of uniting the physicians of that locality through a single means of expression, by which they may be informed or may themselves inform others; and second, that of providing a convenient record of medical facts *pertinent to the locality concerned*.

This last phrase will bear serious consideration. If a provincial medical journal accepts and publishes articles of wide, unrestricted scope and application, there is danger that it will usurp the functions of the Journal of the American Medical Association or of the regional medical journals, and that it will find itself on occasion publishing material merely because the material was not good enough to justify its acceptance by a more widely circulated publication. If, on the other hand, a provincial journal accepts for publication articles of extremely limited scope, such as reports of extraordinarily rare diseases or highly technical research problems, it will be in danger of wrongly assuming the proper function

of the many excellent specialistic journals whose task it is to disseminate such information to those physicians who are particularly interested. Again, the result is likely to be the publication of inadequately prepared material.

We are quite aware that we have already sinned to some extent in respect to both of these rules. We are proud, however, of having already been able in several instances to publish good papers on distinctively local problems.

The definition of what constitutes a "distinctively local problem" may vary a little from time to time. At the present time we feel that war medicine and war surgery have some claim to be included in that category, and for this reason we have allowed this first issue of Volume 2 to consist exclusively of papers relative to the disposition of war casualties. All of these were delivered and discussed at the annual meeting of the Hawaii Territorial Medical Association in August.

We are also inclined to recognize the existence of a few minor and occasional exceptions to our general rule. A "local" journal, particularly when it serves such a comparatively small medical population, may very well serve the purpose of providing a relatively immediate outlet for brief preliminary reports of subjects which merit more extensive or more detailed consideration in either a more widely circulated or a more highly specialized publication at a later date. Another exception is found in articles which have outstanding educational value. It has been and will continue to be our effort to publish such articles under the headings of our three regular columns, Progress in Internal Medicine, Recent Advances in Surgery, and Clinicopathologic Comment. Reports of interesting and instructive cases—not merely "rare" cases—would be included in this category. Still another exception, for Hawaii, may lie in the fact that we are at a considerable distance from the Mainland, and that our journal may therefore very well subserve in some degree the task of a regional medical journal. This, however, is a privilege which we will try not to abuse.

With these general principles to guide us, we are looking forward to a second year of existence in which we hope we may go further toward proving that the physicians of the Territory of Hawaii need,

and are justified in continuing to maintain, the HAWAII MEDICAL JOURNAL.

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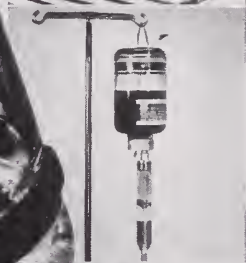
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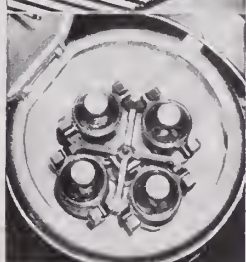
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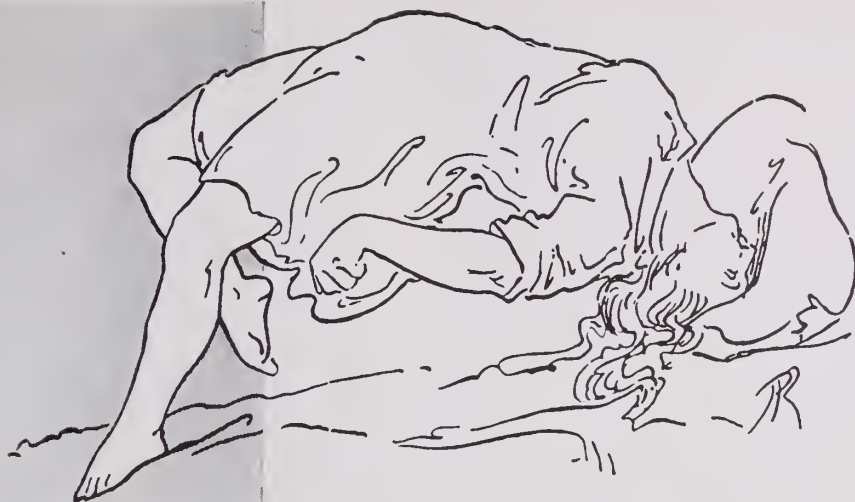
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1. McEachern, D.: Canadian Med. Ass'n. J., 45:106, 1941.

2. Lennox, W. G.: Med. Ann. Dist. Cal., 10:461, 1941.

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War Wounds

A. W. SPITTLER, LIEUTENANT COLONEL, M.C. U.S.A.*

In speaking of wounds in general in connection with war casualties we are speaking of potentially infected wounds, for all war wounds are contaminated. Although the treatment of these wounds has been almost revolutionized during the past few years by the advent and increasing use of sulfanilamide and its allied products, both locally and generally, the basic principles of surgery in their treatment have not changed materially since the last war.

The treatment of several hundred casualties at Tripler General Hospital on December 7 and on subsequent days did a great deal toward convincing us that the local use of sulfanilamide powder was almost miraculous in producing cleanly healing uninfected wounds.

The fact that Dr. Moorhead was delivering a series of lectures on war wounds to this group at the time had a very beneficial effect on the type of surgery done. The fact that he emphasized thorough debridement and subsequent open treatment for all war wounds went a long way toward making those who were dubious about the open treatment practice it in our operating room when they found him working there also. These two principles, when practiced thoroughly, immediately showed the difference between a poor surgeon and a good one; but there is no doubt that the open treatment keeps the poor surgeon from having too many fatalities due to infection.

Before December 7, and in the subsequent literature of those not acquainted with the experience here, the literature was divided on the relative advisability of the open or closed treatment of wounds after debridement and local implantation of a sulfonamide powder.

There is no doubt that one can "get away" with an occasional case with primary closure if one is a very thorough surgeon and does a meticulous debridement down to the most minute crevice, removing every bit of foreign material and devitalized and soiled tissue, and mechanically washing all surfaces. Another type of surgeon, who does a "careless" inaccurate closure after a fair debridement, at times has a good result because for practical purposes his wound remains open.

Prior to December 7, I advocated closing most wounds, and, early in the use of sulfanilamide powder locally in wounds, proudly reported before this society a number of cases which healed promptly on primary closure over the powder. However, these cases were done at a time when our operating room was meticulously clean; we had only a case or two to treat at one time; they were brought to the hospital comparatively early after injury, and we did thorough debridements. The cases which arrived on December 7 soon convinced us that to treat them as we did in ordinary times would take too much time for patient, doctors and facilities. Even with the best of planning and the most adequate facilities, there would still be comparative gross contamination of the operating room and all facilities. The wounds were too extensive and too often multiple to permit painstaking search for all bits of tissue and foreign bodies; so that, as Dr. Moorhead advocated in his subsequent lectures, we had to transform ourselves into war wound surgeons and do the best we could for the most patients. In so doing, parts of wounds were occasionally missed in the cleaning process or recontaminated from the table, and to have closed the skin over these unclean parts, even though sulfanilamide powder was present, might have resulted in an infection with at least anaerobic organisms. To leave them open is a safeguard against this trouble and produces no harm. Later closure is easy if they remain uninfected.

In the treatment of war wounds it is assumed that we are taking care of these wounds as a primary treatment, of which previously applied first aid measures are not a part. First aid may have some bearing on our end result, but for purposes of this paper it is sufficient to assume that only gross dirt has been removed and hemorrhage temporarily controlled, with a sterile dressing applied. The use of an antiseptic on the surrounding skin as a first aid measure does no good; it only produces a feeling of false security. The first aid use of a sulfonamide powder as a bacteriostatic agent in the wound should be seriously considered, especially in any cases which might not receive definitive treatment for several hours. The treatment of shock and other preliminary

* Chief of Surgical Service, Tripler General Hospital.

measures, such as the administration of tetanus toxoid, should be completed before the patients are taken to the operating room for surgical procedures. However, one must remember that shock may recur during the operation and may have to be combatted again and again. (As a practical measure to allow for as much time as can be given to the treatment of shock in our hospital, we have delayed the administration of the tetanus toxoid until the cases reach the ward after operation.)

CLEANSING

After the case is prepared generally for surgery, local preparation of the surrounding skin should include thorough cleansing with soap, water, grease solvents, etc. Shaving should be careful and wide. The application of an antiseptic up to the wound margins is good practice, although not essential if the mechanical cleansing with soap and water is adequate. The use of a large number of drapes is unnecessary.

DEBRIDEMENT

A thorough debridement is then done to include uncovering all tracts and cavities made by the missiles in producing the wound. Too often a perforating or penetrating wound looks so innocent that opening of the skin over it and exploring its depths is not done. These cases often develop infections necessitating later opening and drainage and a prolonged convalescence. When such wounds are opened, there is often much more extensive muscle damage and buried foreign material, such as clothing bits, than was anticipated. If they are thoroughly cleaned out, the layers sprinkled with sulfanilamide powder and the wounds of entrance and exit left open, they can often be completely closed on the third day and the patient returned to duty on the tenth day.

In doing a debridement, a thorough knowledge of anatomy is essential. This, in addition to a good exposure, keeps one from doing any harm. The size of the wound has little effect on its healing, so a good exposure of the depths of each wound should always be obtained, and this can only be accomplished by an adequate skin opening over it. This does not mean extensive slashing of fascial planes and muscle fibers, for should the wound become infected, the operation may have produced more damage than the original injury. Longitudinal openings along normal lines of cleavage do very little damage. Also, it is not necessary to cut away large masses of normal tissue in a debridement: a very thin slice may be sufficient to remove all the

devitalized tissue. During the debridement and after, a thorough lavage with saline helps remove foreign material as well as dead tissue, and should be practiced in all cases.

Hemostasis is essential, as a blood clot is an excellent medium for the incubation of organisms. The tying of all large bleeders is an essential part of the debridement of the wound; and in so doing the smallest amount of tissue possible included in the tie comprises one of the things a good surgeon strives for. Tie only the vessel, if possible.

Extensive search for foreign bodies deeply imbedded in bones or far from the wound in inaccessible places, is not indicated. Most of the foreign bodies will be found in the debridement; if not, leave them until later or forever. They may never cause any trouble.

SULFONAMIDE THERAPY

I doubt if anyone who saw the wounds of December 7 remains at all dubious about the efficacy of local implantation of sulfanilamide powder or crystals in the wounds after surgery and even in the operative wounds produced in opening of cavities during the treatment of these patients. We were all convinced that surgery could not claim all the credit. Only a little over one-third of the casualties went to the operating room for extensive surgery in the first three days, the remainder being treated on the various wards, in many instances with inadequate surgery but with sufficient amounts of local sulfanilamide or other sulfonamide powder. An intravenous sulfathiazole preparation which normally is considered corrosive outside of the vein was applied locally on several of the latter cases. This produced just enough corrosive action to cause minor sloughs of devitalized tissue in these wounds and eventually they were as clean as the debrided wounds.

Less than 10 per cent of all the air raid cases treated developed infections, and none was so severe as to cause death or secondary hemorrhage, or to require extensive surgery to control infection, with the exception of the cases treated as gas gangrene suspects. I do not believe that the amount per square inch matters greatly, but the total dosage should be controlled so that an overdose will not be given to a person who has exceptionally good absorption. Thirty grams on an open wound or wounds or in cavities should leave a good margin of safety, though I saw as high as 50 to 60 grams placed in some cases without untoward effects. However, I have seen blood concentrations as high as 15 mgm. per cent following 20 grams placed in

a knee joint. The choice of the drug probably has something to do with the effect. Sulfanilamide powder is the most soluble and in our experience has less tendency to cake than sulfathiazole. We had no experience with sulfadiazine powder but Dr. Perrin Long believes it to be the drug of choice for local as well as general use in war wounds.

The general administration of the sulfonamide drugs must be used in addition to their local use in all extensive wounds, and should be started without delay. Should the patient have an extensive local injury and receive a large local dose of the drug, a blood determination may be taken in eight hours and used as a basis for general administration of more of the drug by intravenous, oral, or subcutaneous routes. The subcutaneous use of 0.8 per cent sulfanilamide solution is very useful where the drug is not tolerated by mouth, and a daily dose of 4 to 6 grams can be given very easily. In the post-operative treatment, the only other drugs needed are sedative and occasionally stimulants. Tonic doses of whole blood or plasma sometimes help in the convalescent period.

SUTURES

Suture material in the wounds produced by trauma should be minimal. The best material for ligation of blood vessels is fine catgut. Silk or cotton might add to foreign body drainage if the wound develops infection. Primo-secondary suture is a fine way to suture these wounds if there is enough skin present to cover the defect. The placing of the suture at the original operation, while the patient is under the anesthetic, obviates the use of another anesthetic for closure of most of these wounds as the sutures can be tied on the third day without an anesthetic if no infection is present in the wound. Should time not permit the placing of these sutures, they can be delayed until time for closure. If infection develops, they cannot be used anyway. For suture material in placing primo-secondary sutures, the heavier silks such as No. 5, No. 8 and No. 18 as well as dermal, No. 20, cotton and silkworm, medium or heavy, are best. Catgut usually becomes too soft to withstand the pull in closure and finer materials break.

There are only two places where the use of primo-secondary suturing or open treatment of wounds should not be used. Scalp wounds, especially those involving skull and brain injury, should be closed. These heal very readily after a thorough debridement anyway, and seldom become infected. Facial injuries should, if possible, have primary closures with thorough cleansing of the underlying

tissues before closure, because of the cosmetic result. If they are extensive, however, open treatment may be used.

In extensive wounds the primary suture of vital structures such as nerves and tendons should not be considered except during the first few hours (Moorhead uses six hours as a deadline), and not even then if the wound is grossly macerated and contaminated. All plastic repairs should wait until such time as infection either has been ruled out or has definitely subsided. In the case of nerves and tendons the closure of the wound by suture, secondary suture, plastic closure or skin graft, should be accomplished first.

Blood vessel surgery should be delayed until the tissues have returned to a nearly normal condition about the vessels. At least three to six months is often necessary. The successful treatment of an arterio-venous fistula and an aneurysm of the femoral artery in the group of cases after December 7 plainly showed us the necessity for this delay.

Emphasis may well be laid on these phases of the treatment of war or other traumatic wounds. During the first three days, emergency surgery should be done with increasing reluctance after the first six hours. During the period from the fourth to the seventh day, infections are developing and only the treatment of these should be carried out at this time. During this phase, gas gangrene suspects are for the most part treated. After the eighth day, plastics may be started if no infection has developed. The length of time for individual secondary operations must be carefully gauged in each case, with due regard for the condition of the tissues involved.

In the original dressing of the wound, due consideration should be given to splinting extensive wounds by heavy dressings, plaster and splints. Dressings in general should be inspected after twenty-four hours, then not again for forty-eight hours if the wound is clean and gas gangrene is not suspected. At that time, if primo-secondary sutures have been placed, these are drawn up, provided the wound is clean. After this, dressings are only made on such cases as need further treatment, as in the case of adhesive strapping of areas not adequately closed by the sutures. At these dressings sulfanilamide powder is sprinkled on the raw surfaces: it does no good to waste it on the skin surface.

In infected wounds the best treatment is wet dressings with heat. This may be saline or other solution. The addition of a sulfonamide to the solution may be used or it may be sprinkled on the

wound at the dressing. Of course, in infected phases the drug is given by mouth in the usual dosage of 1 gram every four hours.

GAS GANGRENE

In the treatment of gas gangrene suspects, although this is a separate phase of wound surgery in itself, a thorough secondary debridement is done, with wide incision of fascial planes to expose all layers to the air, and local use of sulfanilamide. Occasionally an amputation may be necessary to save a patient whose limb is grossly contaminated. X-ray treatment was instituted in all our cases and carried on until there were no signs of the disease. Five definite cases were diagnosed out of ten suspects transferred to the gas gangrene ward, and all were so treated. Twelve other cases were given prophylactic x-ray treatment. All of these cases were given sulfanilamide by mouth during this period. They were isolated for about two and a half weeks. All of these cases recovered without therapeutic amputation, although one case developed the disease in a high thigh amputation stump.

PLASTIC REPAIR

Extensive skin loss should always be considered for early grafting, should primary treatment produce a clean wound. With the use of sulfonamide powder this can now often be done within two weeks of the injury. The use of all types of grafts can be made. In my experience, sliding and pedicle grafts produced the best results where there was great loss of subcutaneous tissue. Large split-thickness grafts with the use of the dermatome are good where the loss of tissue is not as great.

ANESTHETICS

An anesthetic agent used extensively in the treatment of war wounds at our hospital was intravenous pentothal sodium. It is a good agent if there are no contraindications to its use. Local anesthesia does not allow for the best debridement, in extensive cases. Spinal anesthesia where it can be used is good. Nitrous oxide and oxygen was also used extensively in our cases, as well as open drip ether.

During the period since December 7, there has been a much higher incidence of the type of injuries requiring open treatment. We have made it a definite rule at Tripler General Hospital to treat them in that manner. Of approximately 80 cases treated, there have been no severe infections. There was one death due to secondary hemorrhage from a fecal fistula which eroded an iliac artery at an area which had been damaged at the time of the original

injury. However, most of these cases are treated within the optimum period. In the cases of December 7 which developed gas gangrene, most were treated early on the first day of surgery, but most of them were treated by closed methods.

SUMMARY

Two principles of surgery, thorough debridement and subsequent open treatment, are essential to produce uniform good results in the treatment of wounds produced in war casualties.

The local use of a sulfonamide powder, combined with the general administration by oral, intravenous or subcutaneous routes, does a great deal to reduce the incidence of infection in these wounds.

Wounds should be watched carefully early in their treatment for infection and gas gangrene. Gas gangrene can be combatted successfully by surgery, sulfanilamide locally and generally, and x-ray therapy. Wet dressings are best for infections.

DISCUSSION

COMMANDER T. W. DOWNES, M. C., U. S. N. R.: This paper of Col. Spittler's is an excellent one, on which it is a privilege to comment. It gives, I think, a summary of the best opinion at the present time in regard to the treatment of war wounds.

In common with much of the recent literature, Col. Spittler, it seems to me, rather underestimates the bactericidal effect of the patient's own tissues, and lays too much stress upon chemotherapy. He describes, it is true, the thorough mechanical cleansing and debridement, careful hemostasis, and other things that should be done, but my general impression upon first reading this paper was that if only the "magic medicine" is used in large enough quantities, nothing else really matters very much.

Although, as Dr. Spittler has said, all accidental and war wounds are contaminated and potentially infected, the degree of contamination varies widely, as does the local and general resistance. The ideal treatment of such cases consists, as he says, of thorough debridement and mechanical sterilization, with primary or delayed primary suture. However, the use of any chemical antiseptic injures tissues as well as bacterial invaders, and is to be deprecated, though it is sometimes necessary.

In my professional lifetime a number of different antiseptics have been introduced and have been highly praised which later either have gone out of use altogether, or have been less employed. I believe the present uncritical enthusiasm for the use of the sulfa drugs will go through the same cycle, and that they will later enjoy a more limited and a more discriminating use.

Every recent article on wounds refers to the amazing results secured after the battle of Pearl Harbor, and the reports of Dr. Ravdin and Dr. Long are much quoted. They give a large measure of credit for these results to the lavish use of the sulfa drugs in the wounds.

In my opinion, there were many other factors which must equally well be involved in the explanation

tion of these results. The patients were a selected group of healthy young men in excellent physical condition and exceedingly well nourished. They were rested, not exhausted. They were clean. Even though they became smeared with fuel oil and soot and were filthy from an aesthetic standpoint, these substances were surgically relatively clean. They were not weakened by exposure to the elements for long periods; their wounds and clothing were not soiled with mud and dirt from cultivated and manured fields; and there was no long interval between the injury and the institution of surgical care. On the contrary, their hurts were attended to very promptly indeed. Finally, and most fortunately, at the U.S. Naval Hospital, on the U.S.S. Solace, at the U. S. Naval Mobile Hospital No. 2, and at the Tripler General Hospital were a large number of extremely competent and well trained surgeons, both regular and reserve—and, at the latter, civilian as well. All these factors should be considered in any evaluation of the treatment of the Pearl Harbor wounded, without undue emphasis being laid to any one factor alone. Moreover, I think Pearl Harbor was a special case, with conditions present that are not likely to be repeated.

War wounds differ from other accidental injuries only in the large numbers that are likely to occur simultaneously, and in the factors of exhaustion and exposure that are likely to be present. If they can be treated during the stage of contamination, debridement or mechanical sterilization is best, without drugs. If this "golden period" is lost then chemotherapy, local and general, is of service, but it should be used with discrimination and carefully, as an adjunct to good surgical judgment, not as a magic cure-all.

In substantiation of my opinion that good careful surgery is the most important preventative of infection in wounds, I report the following facts.

On December 7, 110 casualties were received at Mobile Hospital No. 2, where I was at the time in charge of surgery. These comprised a variety of burns and wounds, some of them of considerable extent. Sulfa drugs were used in only one case, a superficial laceration, and it became infected. It was the only infection that developed in the whole group.

I was loaned to the Naval Hospital at Pearl Harbor, and stayed there about thirty-six hours. I operated on about 25 cases. I used a sulfa drug in only one of them, a man whose cecum had been badly lacerated by a bomb fragment. Although I could not care for these patients personally, being recalled to my regular post, I have been informed by Captain Frank Ryan, at that time executive, and by Dr. Paul Spangler, my successor at Mobile Hospital No. 2 and at that time on the surgical staff at Pearl Harbor, that all my patients did well.

Furthermore, during the battle of Midway, three weeks ago, the ship on which I am at present serving proceeded to sea and took on board sixty casualties from the battle, among other people. Most of these were severely wounded. Many, not all, had had a little sulfa drug before they came under my care, but it was stopped at once, as I thought it unnecessary, except in one man who was suffering with gas gangrene when I received him. All of these patients, without exception, improved while on the voyage home and no new infections developed. When I saw them a week later in the hospital, they were continuing to improve, although I do not know what treatment they had had after leaving my care.

Shock

C. T. YOUNG, LIEUTENANT COLONEL, M.C. U.S.A.*

Shock is a profound depression of the vital processes characterized by reduction in volume of the circulating blood, poor tissue oxidation, vasoconstriction and rapid change in the relative proportion of the various blood elements. Briefly, shock is, according to Harkins, a progressive vasoconstrictive oligemic anoxia.

CAUSE

Theories as to the cause of shock are numerous. The most popular theories, briefly, are as follows: (1) the toxemia theory, in which the causative agent has been regarded at various times as either autolysates of muscles, toxins from damaged tissues, products of cellular disintegration, or toxic nitrogenous substances from traumatized muscles; histamine liberation resulting from injury of tissues has long been regarded by some as a cause of shock; (2) the theory of oligemia, from whatever cause, first promulgated by Sherrington and Cobbett, had many followers for years; Blum and Cannon insisted "shock is hemorrhage" and "hemorrhage is shock"; (3) the neurogenic or reflex theory of Goltz, Keen and Mitchell has been in the foreground at various times; sympathetic-parasympathetic imbalance, advocated by Mueller and others, has had its followers; adrenal gland exhaustion has been popular at various times, and is at present—Blalock speaks of adrenal gland exhaustion as being an ineffectual attempt to oppose histamine effects.

In primary or neurogenic shock, reflex vasodilatation, or increase in the size of the vascular bed, is the most important initial change. The vagal mechanism is probably responsible. It usually occurs immediately after the injury. It is seen also with the use of spinal anesthetics and in operations on the brain or spinal cord, or in operative procedures which involve pulling on the mesentery or peritoneum. It is usually temporary and responds well to vasoconstricting drugs. In secondary (which is known by some as hematogenic) shock, the most common type among battle casualties, a decrease in the volume of circulating blood plays a primary role. Vasoconstriction occurs early in this condition and only terminally is there vasodilatation. Evidence of this sometimes is not apparent for several hours.

Normally many factors influence the amount of fluid in the body and a normal partition of this total water among the tissue cells, the extracellular

spaces and the vascular system. The intake of water and electrolytes must keep pace with the loss of these elements from the body. There must be sufficient plasma protein to hold an adequate volume of fluid in the blood stream. In hypoproteinemia there is a reduction in ability to hold fluid in the blood stream, so the escape of pathologic amounts of fluid to the tissues occurs. An additional factor, which is becoming of increasing importance according to Meakins, is the selective permeability of the capillaries which allows water and crystalloids to pass freely but holds most of the proteins in the blood stream. Whether increased permeability of the capillaries is the fundamental reason for the reduction of the effective blood volume resulting in shock is still controversial. Some investigators believe mechanical, chemical or thermal trauma also may initiate liberation of some substance that results in increased permeability of the capillaries. Oxygen lack is regarded as a more likely cause of this altered permeability by Black. Meakins insists that abnormal capillary permeability is a common denominator of the shock syndrome regardless of the initiating factors.

In the reduction of blood mass, the blood serum transudes through the capillary walls into the tissues, so that the blood in the vessels is concentrated considerably. With the hemoconcentration a higher red cell count results. A marked leukocytosis with preponderance of polymorphonuclears is often seen during the first few hours. There is in some instances 50 to 65 per cent reduction of the normal volume of blood. Since the loss at first is mainly one of water and salts, both the plasma proteins and cellular elements of the blood become more concentrated at first. However, when plasma loss really starts, together with electrolyte change, a reduction in the colloidal osmotic pressure of the remaining blood occurs and a reduced ability to draw on the extravascular reserve follows.

BLOOD CONCENTRATION AND OTHER CHANGES

There is variable blood concentration in various types of shock. Following hemorrhage there is an immediate marked drop in both cell and plasma volume, but after physiological adjustment and redilution, the plasma volume increases rapidly. There is very little change in hematocrit at first. The cells remain quantitatively about the same. The hematocrit is quite low after redilution. After burns the

* Medical Service, Tripler General Hospital.

cellular elements remain the same quantitatively but the plasma volume decreases rapidly, as in hemorrhage. The hematocrit rises at first but after redilution it usually returns to normal. Immediately after the usual type of accident where there is very little blood loss, there is mixed blood and plasma loss. A slightly higher hematocrit is the usual finding thereafter but after redilution it falls below normal, not as greatly, however, as after hemorrhage. The above illustrates that hemoconcentration cannot be used as the only guide to treatment. Physiological adjustments help for a short time, even without therapy, to cushion the effects of injury.

Massive loss of whole blood through hemorrhage may promptly reduce the blood volume to an amount incompatible with sustained circulation. The blood pressure fall results from the reduction in blood volume. In the terminal stage of secondary shock the vasoconstriction stage finally passes, followed by vasodilatation. This latter change, as well as blood volume changes, are reflected in the blood pressure. Blalock says peripheral circulatory failure, resulting from a discrepancy in the size of the vascular bed and the volume of intravascular fluid, is the chief manifestation of shock. When the blood volume is reduced, there is decreased cardiac output. There is an excess of blood cells in the capillaries with resultant congestion and increased viscosity of the blood. Oxidation is much reduced, as proven in animal experiments by Ault and Cunningham, and with the consequent lack of oxygen in the tissues, non-respirable acids, such as lactic and diacetic acid, replace carbonic acid. Lack of oxygen profoundly affects the nerve cells and disturbs their function. To maintain oxidation of the body tissues, a minimal systolic blood pressure of about 80 mm. of mercury is required. This so-called critical level marks the blood pressure level below which there is cessation of adequate flow of blood to the tissues. Anoxia causes marked depression of metabolic processes of the body as a result of which heat production drops off, sometimes as much as 65 per cent. The CO_2 combining power of the plasma drops often with a serious reduction in alkali reserve; acidosis is produced. Evidence of hyperpnea appears when the CO_2 combining power falls below 40 per cent. Another chemical change in shock sometimes seen is an increase in the N.P.N. and creatinine, and a drop in sodium and chloride content. Potassium is usually slightly increased.

It has been observed significantly in animals that a perceptible fall in blood pressure sometimes occurs only a short while before death; however,

the plasma volume, the plasma protein concentration and hematocrit showed much earlier changes. In spite of the very early loss of plasma proteins and fluids, electrolytes and the consequent reduction in blood volume, the blood pressure at the end of six hours in the experiments conducted by Blalock was only slightly lowered. The vasoconstriction, it has been shown, aids in the maintenance of the blood pressure at its normal level despite marked plasma volume reduction.

CLINICAL EVALUATION OF SHOCK

The classical symptoms of shock are well known; cold, moist, sweating skin; thirst, vomiting, restlessness, mental dullness, reduced sensitivity to painful stimuli, apprehensiveness, etc. Objectively the patient may appear dehydrated, cyanotic, pale, perspiring, with a rapid thready pulse and in the latter stages a low blood pressure. Blood pressure determinations give a better index to the condition of the circulatory system than do pulse checks. The blood pressure, taken frequently, should be recorded.

Time does not permit the description of the falling drop method of Barbour and Hamilton but the information gained from its use is considerable. Those interested are urged to familiarize themselves with this procedure. If too many cases in shock do not have to be cared for at once it can be used to advantage in evaluating the status of battle casualties.

Meakins says "the beginning and progression of shock is best detected by frequent and accurate estimations of hemoglobin or by the hematocrit. A rising hemoglobin percentage or an increase of cells to plasma ratio indicate hemoconcentration due to loss of plasma through the capillary walls. This is probably the earliest indication of shock."

Black (Year Book of Therapeutics, 1941, page 240) gives a formula by which the blood volume may easily be calculated. For approximate calculation of plasma volume deficit, one is justified in assuming a hemoglobin percentage of 100 and a blood volume of 5 liters, 3 of which are plasma. The table below gives *trend* of change in plasma volume providing there is no hemorrhage.

Estimation of Plasma Volume Reduction Based on Formula by Black

Hemoglobin Percentage (Haladine)	Blood Volume (L.)	Plasma Volume (L.)	Estimated Deficit in Plasma Volume (cc.)
100	5.0	3.0	----
105	4.75	2.75	250
110	4.55	2.55	450
115	4.35	2.35	650
120	4.15	2.15	850
125	4.0	2.0	1000
130	3.85	1.85	1150
140	3.55	1.55	1300
145	3.45	1.45	1450
150	3.35	1.35	1550

These laboratory procedures are relatively easy to perform and can be done expeditiously. If there are a large number of battle casualties, there may not be time for these determinations, but the physician should grasp every opportunity to avail himself of these aids. The criticism may properly be made that such technical procedures have no place in a system where time is such an important factor. Very definitely, clinical judgment must be relied upon to determine the necessity for immediate treatment, rather than reports on above technical procedures.

TREATMENT OF SHOCK

The treatment of the condition causing the shock—as, for instance, control of hemorrhage—is the first prerequisite. Restoration of body temperature by use of blankets, guarded hot water bottles, or other means, is vital. Too much warmth is to be avoided. Relief of pain and restlessness by morphine is important. Large doses, however, reduce the oxygen interchange in the tissue, and the respiratory rate. Absolute rest in supine position is important. In early shock with vasoconstriction, the posture may be relatively unimportant, but the lower part of the body should be raised as soon as the condition is suspected anyway. Coramine and metrazol are good cardiac and respiratory stimulants and should be used as occasion demands. The use of vasospastics, such as adrenalin, can be harmful, though if used slowly and with care they can be an aid. Slow injection is mandatory. In neurogenic or primary shock vasospastics are particularly good.

Intravenous physiologic saline, or even at times hypertonic saline solution, to relieve the electrolyte and fluid depletion, is vital. In patients suffering from shock an overdose of fluid can be dangerous. Black, of Oxford, states the danger is less with protein-containing infusions than with saline. Oral and subcutaneous fluids are of much less help. Glucose has relatively little value compared to physiological saline. Blood plasma, which contains the vital proteins of the blood, can be administered immediately and this is an important advantage. Dried human plasma which can be put into solution quickly and which is always immediately available in all our medical installations, represents our best source of intravenous fluid. Because of the vital proteins in the plasma it is superior to the saline, though electrolyte replacement must not be overlooked.

Time does not permit discussion as to relative value of concentrate and dilute plasma. Blood transfusion is valuable to restore blood volume and like-

wise to replace proteins, but the cellular elements are not needed nearly so much as the proteins in the average case of shock. Where there is serious loss of blood due to hemorrhage, transfusion is usually to be preferred. Volume for volume, plasma transfusions introduce protein even more rapidly to the blood stream than when whole blood is given. There is also less danger from reaction than when blood is used. Blood plasma and serum adequately restore depleted blood volume and serum protein deficiencies. In traumatic shock, the initial dose of plasma can be as high as 750 cc. and as much as 2500 cc. may be required the first twenty-four hours after injury, with 1000 cc. daily for three days. In extensive burns, 2000 cc. of plasma may be needed the first twenty-four hours with 1000 cc. daily for three days. Whole blood is indicated after the third day.

Whole blood and plasma should be given early if there is shock due to hemorrhage. Water cannot be retained in the body without sufficient salts to make an isotonic solution. Any attempt to restore water alone is unsatisfactory. Sodium and chlorides are both depleted and must be replaced. If much vomiting has taken place, the chloride is particularly depleted. Isotonic solutions are usually used.

If there is increased capillary permeability, the introduction of aqueous solution dilutes the plasma further and increases the capillary permeability, so tissue edema is accentuated. Measurement of hematocrit or hemoglobin determinations are the best means of following this. If fluid is being retained in the blood stream, hemoglobin and plasma protein should decrease in concentration together. When hemoglobin is increasing and plasma is decreasing the plasma is being lost from the blood stream. It may sometimes be advantageous to give hypertonic solutions to avoid giving too much fluid in the vein. Ringer's and Locke's solution can be used advantageously.

Adrenal cortical extract (eschatin) is presumed to influence the permeability of injured capillaries. Its use with 5 per cent salt solution is claimed by Scudder to be helpful in severe cases of shock. As chloride retention occurs in patients given adrenal cortical extract, Rhoades, Wolff, and Lee say that salt solutions should not be given concomitantly unless chloride determination is done. However, as capillary permeability is reduced, plasma can be afterwards given to greater advantage. Adrenal extract, according to Helfrich, is more effective if given prophylactically than if given after shock has already appeared.

Oxygen is one of the best cardiac stimulants known for patients with anoxemia. It can be given by B.L.B. mask, by tent, or by nasal catheter. The establishment of a method to give large numbers of patients oxygen is now in progress by use of multiple outlets from a line carrying oxygen under pressure. The outlets are connected to bubble bottles through which the oxygen passes to the masks. Each patient in the shock room or ward with this arrangement receives oxygen as needed.

The ideal arrangement is to have a special shock ward where each of the attendants has had special instruction and where the set-up permits rapid evaluation of the status of the patient in shock with the necessary treatment given quickly and as long as his condition requires it. Without such an arrangement the treatment is apt to be haphazard and ineffective.

SUMMARY

The cardinal changes taking place in an individual in shock are vasoconstriction, anoxia, alteration of capillary permeability, hypoproteinemia, oligemia, and reduced colloidal osmotic pressure of blood. As a result of above changes, there are hemoconcentration, capillary congestion, diminished blood flow, and decreased cardiac output. Depressed metabolic processes naturally follow such changes.

The main treatment of shock can be summarized as follows: (1) Treat early, even though evidence of shock may not be clinically apparent. (2) Keep patient at absolute rest, with elevation of foot of bed. (3) Apply warmth to the body. (4) Adequate fluid replacement is important, therefore use plasma early and in adequate amounts. (5) Transfusions. (6) Crystalloids, physiological sodium chloride, Ringer's or Locke's Solution intravenously. (7) Cardiac stimulation. (8) Oxygen as needed. (9) Judicious use of sedation, especially of opiates, sufficient to control pain only. (10) Adrenal cortical extract.

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DISCUSSION

DR. S. E. DOOLITTLE: I appreciate the opportunity of reviewing Colonel Young's paper on shock. With memories of December 7 still fresh in mind, it is indeed a timely subject.

The numerous concepts of the underlying pathological physiology of shock and attempts to differentiate various types of shock have always been confusing to me. From the various theses concerning experimental and clinical shock there stand out certain important pathological physiological changes noted by all critics. The most important of these have been re-emphasized by Dr. Young; namely, strong sympathetico-adrenal activity, increased capillary permeability, hemoconcentration and tissue anoxia.

In war wounds, the clinical pictures presented to the physician is rarely that of uncomplicated shock. The state of peripheral vascular failure caused by shock is further augmented by other neurogenic factors (fear, exhaustion, or exposure), by hemorrhage, or by other vital organ damage or disease.

The principles of treatment aim at control of complicating factors as well as of shock itself. Thus the control of hemorrhage, of fear, and of pain are of primary importance. Morphine is the drug of first importance in the treatment of shock. Adrenalin is a dangerous drug. The shocked patient, as I saw him on December 7, is an over-adrenalized patient. Cortin, as Dr. Young suggests, is perhaps better to prevent than to cure shock. It, may however, be of assistance in preventing progression of the condition if given early and repeated frequently. Plasma is the main stop to capillary leaking. It should be given early and in sufficient quantities. If in doubt, and laboratory aids are not available, give more. Whole blood is also needed when hemorrhage is a complication. *Do not forget oxygen.* Much of the damage is due to tissue anoxia and a well oxygenated blood will lessen tissue anoxia.

Abdominal War Wounds

L. D. HEATON, LIEUTENANT COLONEL, M.C. U.S.A.*

The patients we have seen with abdominal wounds are invariably in a rather marked degree of shock when first seen on our receiving wards. The prompt relief of this shock is indicated before any attempt is made to determine the extent of the injury or the methods of choice in its repair. Plasma has become the sheet anchor in our treatment of this condition but we have not lost sight of the use of blood transfusions or saline and glucose infusions. No operative procedure is considered until shock is controlled, except where gross hemorrhage is felt to be the responsible factor.

When this shock has subsided we attempt to visualize the probable tract of the responsible agent in an effort to determine the structures most likely to have been damaged. If the wound is penetrating rather than perforating, which is most frequent, the use of x-ray will aid considerably in this step. Catheterization should never be omitted. The object of this visualization of the tract is to determine the most nearly ideal incision for exploration. Cases will be seen where the wound tract appears to be entirely extraperitoneal. We advise caution and careful observation for signs and symptoms of peritoneal irritation in this type of wound. We have had two cases in which the traumatic agent remained extraperitoneal throughout its course, yet laparotomy revealed ruptured small bowel in both instances. We therefore agree with Bailey that "it is better to open and see than to wait and see."

OPERATIVE PROCEDURES

In the selection of anesthetics we have remained firm in our belief that open drop ether is superior to all others. Spinal anesthesia has no place in patients who are so prone to shock.

When we could demonstrate no special reason for a particular incision, we have used either a mid-line or a right paramedian approach. The incisions should always be made through clean untraumatized tissue, if at all possible. Adequate exposure has been a fundamental principle in all cases.

On opening the peritoneal cavity we first look for gross hemorrhage of such a degree as to demand primary consideration. We do this with minimal handling of viscera. So far we have not seen a single

case where hemorrhage of this calibre was present, except in cases of splenic rupture.

When we are satisfied that no significant hemorrhage exists, we examine the bowel in a definite and systematic fashion. The colon is examined carefully, starting with the transverse portion. This is done first because of the degree of contamination resulting from perforations of this organ. If damage of the colon is found, it is repaired before examining other organs. We next examine carefully the small bowel from below upwards, inspecting its associated mesentery at the same time. Here, as in the colon, surgical repair is made, as the injury is localized so as to minimize contamination. The stomach and duodenum are then examined. Injury to the duodenum is rare, but stomach perforations are frequently found on the anterior as well as the posterior surface.

When the gastro-intestinal tract has been examined, we move on to a careful inspection of the solid viscera, bladder and retroperitoneal structures, if indicated. Splenic tears are not amenable to repair, and removal of the organ is usually preferred. Liver tears respond well to packing with gauze of almost any type. Sulfathiazole powder has been used, because of its reported hemostatic qualities. Sutures in the liver are employed only when necessary. Gall bladder and duct damage is best cared for by temporary measures of drainage. Pancreatic wounds, except for possible hemorrhage, are quite self-limited. We do not hesitate to explore or repair kidney or ureter damage by the transperitoneal route. We have performed nephrectomy by this route with excellent results. Bladder tears require simple suturing and indwelling catheters.

In general, when considering any gastro-intestinal wound, it has been shown that suture of perforations should be practiced whenever possible, rather than resection. In the colon we must not forget that perforations are often retroperitoneal and should not be allowed on this account to escape detection. Infarction and damage to the blood supply of the colon often demand drastic rather than conservative measures. Resection may be necessary in instances where damage is marked and in these cases a prophylactic cecostomy should be performed. The dangers of infection are so severe in some colon wounds that simple suturing should be supplemented

* Chief of Surgical Section, North Sector General Hospital.

with drainage, and even colostomy, without hesitation, if the operator feels it is indicated.

In the small intestine, resection is to be avoided if at all possible but if there is no alternative should most certainly be performed. The chief indications for such a procedure are as in the large bowel:

(1) where a section of the intestine has been destroyed;

(2) where multiple perforations in close proximity make healing unlikely;

(3) where injuries of the mesentery and its vessels endanger the vitality of the gut (a two-inch detachment of mesentery is judged to be in the danger zone).

Multiple resections are to be avoided, for the mortality is especially high. A short-circuit operation may be employed if obstruction is anticipated, but should not isolate long segments of gut as this may result in nutritional disturbances. We have employed the end-to-end technique for resections whenever possible. Side-to-side methods are quite satisfactory however, especially to avoid difficulty with an uncooperative mesentery. All our bowel closures and resections are done with gut and silk, employing the Connell, Cushing or Lambert stitches.

Duodenal wounds are relatively rare and we have had none so far on our service. Gastroenterostomy, or even partial gastric resection, may be necessary for satisfactory reconstruction. Stomach wounds may usually be sutured without difficulty.

In all abdominal wounds we have placed from 4 to 16 grams of powdered sulfanilamide intraperitoneally and over the suture lines at the completion of surgery. Drains or packs are brought to the exterior through stab wounds or through entrance or exit wounds after debridement, if they are in a suitable position. Our exploratory wound is closed tightly in layers and as a last procedure the entrance and exit wounds are debrided. Sulfanilamide powder and vaseline gauze are then inserted in the resultant tracts.

It might be well to mention that we have had a number of thoraco-abdominal wounds on our service, the majority of them with successful results in spite of their relatively lethal nature. In these cases we treat the chest conservatively, if possible, and if surgical intervention is necessary we attempt to make closed wounds out of those that are open. We repair the diaphragm, if it is at all possible to do so, and prefer a separate abdominal incision for exploration rather than the trans-diaphragmatic approach.

POST-OPERATIVE CARE

Our post-operative routine is like that practiced in most abdominal surgery, but it is necessarily more extensive. Parenteral fluids and morphine are given as required. The inevitable ileus is combated with continuous Wangenstein suction or Miller-Abbott tubes. Oxygen tents or masks are of considerable help in most cases and are indispensable in thoraco-abdominal wounds.

We never institute sulfa drug therapy for the first twenty-four hours following surgery. Adequate blood levels of sulfanilamide are maintained during this period from peritoneal absorption. Even if we find no special indication for sulfonamide therapy we continue it thereafter for several days as a prophylactic measure in suitable cases. We have found sodium sulfadiazine intravenously to be far superior to other sulfa drugs, particularly when oral administration is impractical. It necessarily must be used with caution, however. Blood levels of 5 to 13 mgm. per cent are to be maintained, and dosages governed accordingly. Oral dosages, when this route was feasible, have averaged 1 gram each four hours, and we have maintained this therapy for three to seven days post-operatively. Daily sulfonamide blood levels, frequent blood counts and urinalyses, are recommended. A urinary output of at least 1,000 cc. per day is essential when patients are on such therapy.

Blood transfusions and other supportive measures are given as indicated. Some anemia invariably follows such injuries and the sulfa drug therapy may aggravate this picture.

CONCLUSION

In summary, I have presented the methods used by the Surgical Service of the North Sector General Hospital in the handling of these grave abdominal wounds. Our results have been so gratifying that we heartily recommend all of these points for your consideration.

DISCUSSION

DR. JAMES R. JUDD: I am much pleased to have the opportunity of discussing Colonel Heaton's excellent paper, which is short and snappy and to the point, like a well performed surgical operation. The Colonel's conclusions are well drawn. I agree heartily with him that ether, by the drop method, is the safest and most satisfactory anesthetic for emergency war surgery and that spinal and intravenous anesthesia have very little place in such work.

Colonel Heaton's conclusions are based on data obtained mostly from young healthy soldiers. It might be of interest to discuss the effects on civilians of this diabolical method of warfare, first started by the Germans when they bombarded Warsaw from the air in September, 1939.

In the September 1941 issue of Surgery, Gynecology and Obstetrics is an able article by Dr. Gordon-Taylor entitled "The Problems of Surgery in Total War," based on 600 abdominal cases, and I am quoting from this article especially as the facts therein bear on civilian casualties. Every hospital in London except two has been hit by air bombardment. The mortality of children and old people is high, although there have been some remarkable recoveries.

A considerable proportion of the casualties results from crushing force or from the direct or indirect effect of "blasts." In crushing injuries the abdomen is less exposed to damage than the head, shoulders or limbs, and in lesions due to "blast" the lungs are more vulnerable than the abdomen. In this war, civilians suffer from crush-contusions due to falling masonry and from burial under collapsed houses. Masses of wood, stone or metal may be hurled with devastating force against the abdomen; severe visceral damage or retroperitoneal hemorrhage may be produced by "blast" without any external evidence of injury. Frightful wounds have been produced by flying glass eviscerating the patient. These cases are mostly beyond surgical aid.

Multiplicity characterizes wounds sustained from air bombardment. Mortality is raised by lesions of several viscera and many parts of the body being simultaneously damaged.

Burns may be a serious complication of abdominal wounds and add greatly to the gravity of the prognosis.

Associated severe fractures, especially compound fractures, often turn the scale against recovery.

"Blast" injury of the lungs, by reason of the pain produced, may suggest the diagnosis of an abdominal lesion. Some of the patients have rigid abdominal walls. X-ray examination of the chest and the physical signs, especially bulging of the chest wall, should prevent an unnecessary laparotomy.

Abdomino-thoracic injuries in this group approximate 13 percent; the mortality of left-sided

abdomino-thoracic injuries exceeds that of the right side by 20 percent.

Diaphragmatic injury is suggested by an almost entirely thoracic type of respiration with a catch at end of inspiration, yet the actual respiratory rate may be little altered. In later stages, there is fixed pain, exaggerated on exertion and referred to clavicle or scapula, according to the position of the injury.

In patients operated on, the rent in the diaphragm is usually small, less than half an inch long in 50 percent of the cases. Many openings are mere punctures. Wounds of the central tendinous part are more serious than those of the periphery. Small wounds undoubtedly heal spontaneously and others are at least temporarily plugged by omentum, liver, stomach and spleen.

When there is an open blowing thoracic wound or an associated "stove-in-chest," the chest injury must assume priority of treatment.

If an abdomino-thoracic injury has been approached from the abdominal aspect, it is important not to waste time trying to complete a difficult suture of the diaphragm in a critically ill patient, unless the aperture is so large that a herniation of the abdominal contents is certain to occur.

CONCLUSION

1. Despite the gravity of the wounds and the frequent association of multiple injuries, about 50 percent of the patients with abdominal injuries for whom operation is possible, survive.
2. The percentage of recoveries for injuries to the gastro-intestinal tract is higher than in 1914-18. For the large intestine it is about the same.
3. Few survive after lengthy resections of intestine.
4. The employment of sulfonamides locally and by oral administration has proved of great value.
5. Transfusion of blood and its derivatives has made a host of patients operable who otherwise would certainly have died.

Chest Wounds

J. E. STRODE, M.D.

Honolulu

Because of its size, exposure and vulnerability, trauma to the chest plays an important part in a consideration of war injuries. It has been estimated that well over one-third of all fatalities in combat are due to injuries to the chest, and that chest injuries are second only to abdominal injuries in their seriousness.

I am fully cognizant of the fact that many serious injuries of the chest wall and enclosed organs result from trauma that does not cause an opening into the pleura. These injuries are to be discussed by others on the program and will not be considered here. The fact should also be appreciated that an individual having an injury to the chest may have injuries elsewhere as well, and a thorough examination should be made to avoid overlooking such complications.

PATHOLOGIC PHYSIOLOGY

In a discussion of chest injuries it is important to remember a few physiological principles that make the care of such lesions a problem differing from the care of injuries encountered elsewhere. All the organs of the thoracic cage carry on their work under a pressure which is intermittently less than that of ordinary atmospheric pressure. Hence, an opening into the pleura results in collapse of the lung at a rate depending upon the size of the opening. The collapse of one lung would not ordinarily result in serious interference with the cardio-respiratory mechanism were it not for the fact that under such conditions the mediastinum and its structures are usually displaced toward the contralateral lung. Thus an opening into one pleural cavity seriously affects the organs concerned with the vital functions of respiration and circulation unless the mediastinum has become stabilized from previous inflammatory changes.

FIRST AID MEASURES

The first aid treatment of chest injuries may be extremely important, first, in the control of hemorrhage, and second, in the case of so-called sucking wounds. Bleeding is usually from one of four sources. It may be from an intercostal or from one of the internal mammary vessels. In either instance the vessel may or may not be easily ligated.

The bleeding may come from the lung, in which case spontaneous cessation is to be expected, unless one of the larger vessels is involved, because of the low pressure in the pulmonary circulation. The bleeding may be from one of the vessels in the mediastinum, from one of the vessels in the hilum of the lung, or from the azygos veins, in which case control is difficult, and a fatal outcome is likely before the patient can be transported to a place where adequate surgical interference can be instituted.

Many people who lose their lives when an opening is torn into the chest wall could be saved by the very simple expedient of plugging the hole with anything that can be stuffed into it—sterile moist gauze or sterile vaseline packs—or by using the simple apparatus illustrated herewith. Time may be the essence of success, however, so peel off your shirt and use that; or place your hand over the opening; or use any suitable object or material—sterile or unsterile—to seal over the opening.

Strapping the patient's chest with adhesive in the presence of fractured ribs may relieve that patient's pain and help to prevent shock. The liberal use of morphine, if the patient's respiration is not embarrassed, is of value. Shock, of course, is to be combatted by the various methods at our disposal after the patient is hospitalized and before surgery is undertaken. The free administration of oxygen is of particular value.

In penetrating or perforating wounds of the thoracic cage which do not result in open pneumothorax, emergency surgery, except for the control of hemorrhage, is rarely indicated. In civil life, such wounds are commonly produced by stabs from a knife or ice-pick or from a rifle or pistol shot; in the military service, by fragments of high-explosive missiles. In such injuries, signs of accumulating blood in the pleura should be watched for, and when found should be aspirated and replaced by an equal amount of air. Blood left in the pleura invites infection; it is slowly absorbed; and it irritates the pleura, causing it to become thickened, and thereby inhibits lung re-expansion. Air, on the other hand, acts more as a compressible cushion and causes little or no pleural irritation.

TENSION PNEUMOTHORAX

In any trauma to the chest in which the lung, bronchi, or trachea is injured, air in varying amounts may escape into the pleura, subcutaneous tissue, or mediastinum. If with each inspiration air is drawn into the pleural cavity and on expiration it cannot escape, a tension pneumothorax will be produced. This may, when carried to a sufficient degree, result in complete collapse of the affected lung, and so embarrass respiration and circulation as to result in asphyxia of the individual. The symptoms are increasing respiratory difficulty, cyanosis, and signs of shock. The physical findings show hyperresonance over the affected side, distant or absent breath sounds, and displacement of the heart away from the side involved. The x-ray picture, if available, substantiates the clinical findings. The treatment consists of aspirating the air from the pleura until the pressure is zero, or of inserting a catheter intercostally into the pleural cavity. The lower end of this catheter is sealed by connecting it with a rubber tube which is inserted into a bottle containing fluid beneath the bed.

Air escaping into the mediastinum in a similar manner may build up so much pressure that it may interfere with circulation or interfere with respiration by pressure on the trachea or major bronchi. A suprasternal incision into the superior mediastinum may give relief, though usually some grave mediastinal injury has already occurred and results in a fatality.

SURGICAL PROCEDURES

In the repair of open chest wounds, pressure anesthesia is almost indispensable. If it is not available, aspiration of the air in the chest following surgery is important to allow re-expansion of the lung.

If circumstances permit and the patient's condition justifies it, pre-operative x-ray study of the chest to locate foreign bodies is desirable. Wounds in this region should be thoroughly debrided as elsewhere. Foreign bodies should be removed, and blood clots and debris should be sucked out of the pleural cavity, either through the original or enlarged wound or through a new approach if the patient's condition justifies it. From 8 to 10 grams of powdered sulfanilamide should be dusted into the pleural cavity and into the wound itself, and the chest wall closed tightly if possible. I believe it is desirable to place a water-sealed catheter into the chest of all such injured individuals. It would seem wise to place a No. 18 F. catheter in the second and third interspace in the midclavicular line, since there

is less likelihood in this locality of the catheter's becoming plugged by blood or kinked by the patient's lying on it. This, I believe, should be routine since no hospital that I know of in the Territory would be sufficiently staffed to watch carefully for the onset of tension pneumothorax, if we were suddenly called upon to treat a large number of wounded.

POST-OPERATIVE CARE

When the patient is returned to the ward he should be closely watched for signs of hemorrhage, for signs of tension pneumothorax—if a water-sealed catheter has not been inserted—and for onset of shock. If fluid accumulates in the chest, it should be aspirated and the fluid smeared and cultured, and the patient watched for the possibility of infection. Lung abscess from embedded foreign bodies in the lung may occur and should be anticipated.

CARDIAC INJURIES

In passing, mention should be made of injuries to the heart. Most of them are immediately or soon fatal and are not amenable to any type of therapy. Occasionally injury to the chambers of the heart or to the great vessels at its base permits leakage of blood into the pericardial cavity slowly enough to allow successful surgical intervention if the condition is recognized without delay.

Blood accumulating in the pericardium interferes with expansion of the heart, and like the effect of accumulating air in the pleura on the lung, soon renders the heart incapable of functioning. This condition of tamponade of the heart causes cyanosis and respiratory difficulty, diminution in volume of the pulse, weakening of the cardiac sounds, fall in systolic blood pressure, increase in venous pressure, diminished activity of the heart as seen under the fluoroscope, and death in short order if the condition is unrelieved.

CONCLUSIONS

In concluding these brief remarks I want to emphasize:

- (1) The importance of the first aid treatment of so-called sucking wounds of the chest. Plug the hole immediately by one of the methods suggested.
- (2) Control hemorrhage from the intercostals or internal mammaries by ligation or compression.
- (3) Watch out for tension pneumothorax. Aspirate if in doubt. Insert water-sealed catheter when necessary.

(4) Aspirate blood from the chest and replace it with air.

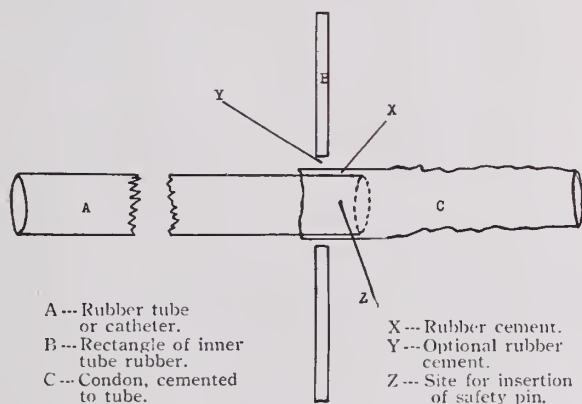
(5) Treat shock in chest injuries as elsewhere before subjecting patients to surgery.

531 Young St.

DISCUSSION

DR. FINNEL: The "thorax valve" mentioned by Dr. Strode serves to seal a small penetrating wound of the chest, or a large, lacerated blowing one, permitting egress of air and fluids, and preventing ingress of air, thus stabilizing the mediastinal contents. It is easily extemporized from available materials, which is a most important feature.

To make such a thorax valve, take a 6 inch length of rubber tubing—anything from a small catheter to a tube of $\frac{1}{2}$ inch inside diameter, depending on the type of wound anticipated. Clean 1 inch of one end with gasoline, xylol or sand paper and apply rubber cement, which is allowed to dry. Take a piece of cleaned auto tire inner-tubing anywhere from 4 to 6 inches square, or rectangular (or larger) and with a cork borer cut a round hole in its center. This hole is to be *definitely* smaller than the outside diameter of the rubber tube that is to enter the thorax. Anoint this hole with rubber cement and permit it to dry.



Stretch the closed end of a condom over the open end of a large test tube and with a hot wire, make a hole in the condom. This hole will have a sticky, gummy edge. By careful stretching of the perforated condom, pull it over the cleaned and cemented end of the rubber tube, to a distance of about $\frac{1}{2}$ inch, letting it contract there. Now pull the bulk of the condom toward the other end of the tube. Apply a little additional rubber cement to the cemented end of the tube, pull the condom back over this area, hold it in place with a rubber band or several windings of twine and give it time to set.

Have an assistant stretch the inner-tube rectangle until the central hole is large enough to admit the tube, with attached condom, and slip the tube through until, on contraction, the inner-tube square firmly grips the end where the condom is cemented. Additional rubber cement may be applied at the junction.

The distal, reinforced end of the condom is cut off with a scissors; because of its collapsed con-

dition, it acts as a flutter valve. A safety pin, through the wall or even the lumen of the distal portion of the tube will prevent the loss of the tube into the pleural space. After the cement is set, this gadget may be sterilized in formalin vapor, or, placed in a jar, may be autoclaved.

For use, the long end of the tube is cut to desired length—it may be fenestrated—and inserted in the pleural wound, the edges of the square of inner tube rubber are affixed to the skin with strips of adhesive. Duco cement, if available in the emergency, would be additionally effective.

This simple apparatus relieves compression of the mediastinum by air or fluids and leaves the patient mobile without need of a special attendant.

DR. H. H. WALKER: Dr. Strode has dealt with the immediate treatment of chest wounds in a concise and able manner. Thoracic wounds in modern warfare are prone to be of very serious nature and carry a high mortality rate. The injury may be of such magnitude as to preclude any chance of survival. Others, however, may have a good chance if there is not too great delay in receiving proper medical and surgical treatment. The first-aid treatment received by the patient in a casualty station is frequently of far greater importance than the late operative treatment in deciding the final outcome. The treatment of shock and hemorrhage always, of course, should be given first consideration. Secondly, or in many instances simultaneously, attention should be directed to the restoration of cardio-respiratory physiology to normal. The patient should be placed in the position affording the greatest comfort—usually semi-sitting. Morphine should be given with the utmost caution and oxygen administered if available. Sucking wounds must be plugged just as quickly as possible. The valvular contrivance described by Dr. Strode and Dr. Fennel would be a good thing to have handy in any casualty station. However, the important point is to plug the wound. External bleeding should be controlled as expeditiously as possible with the least amount of disturbance to the patient. If ribs are fractured, adequate immobilization will be secured by strapping the hemithorax.

One must always be on the alert for a pneumothorax, hemothorax, or hemopneumothorax in the presence of an injury to the chest. Signs may not be evident at the first examination so that these patients must be watched carefully for several hours. It must be remembered that an individual supposedly suffering from shock or a blast injury may also have a tension pneumothorax or hemothorax. A portable x-ray machine when available should be used to establish the diagnosis. However, physical examination of the chest will usually reveal the underlying condition. Of the physical signs, cardiac displacement is the most important. Dr. Strode has described the treatment for pneumothorax and hemothorax. I believe that waterseal drainage is the most foolproof method of dealing with tension pneumothorax. Likewise, I agree thoroughly with Dr. Strode that the blood should be aspirated in the case of hemothorax.

Operative surgery in thoracic wounds, especially in the case of foreign bodies, should be delayed, in my opinion, except when it is necessary to close a sucking wound or when it becomes obvious that intra-thoracic hemorrhage is progressive.

Head Injuries

RALPH B. CLOWARD, M.D.

Honolulu

Few subjects in medicine have produced so much controversy and stimulated so much writing as the subject of head injuries. It would be futile to even attempt to touch upon the anatomy, the pathologic physiology of the various types of wounds, the complications and the divergent opinions on the treatment of cranio-cerebral injuries in this brief period of ten minutes. I shall limit this presentation to a brief discussion of the pathology and the accepted treatment of two types of head injuries—most frequently encountered.

CONCUSSION

The first type of injury is that produced when the head, in motion, strikes an immovable object: for example, falls from high places, or automobile accidents. The pathologic changes in the brain that result are due to inertia of the intracranial contents. It has been shown experimentally that the brain has the physical properties of a liquid. When the head is set in motion and then suddenly stopped, a wave of force is transmitted through the brain. The movement of this wave causes a momentary gradation of pressure changes along its pathway, from a positive pressure at the point of impact to a negative one at the opposite pole. This negative pressure, being lower than the intravascular pressure, may result in a rupture of vessels on the side of the brain opposite the blow. This is the physiology of the so-called *contre-coup* injury. The bony pockets of the skull, into which the frontal and temporal poles are so closely fitted, make these areas of the brain much more susceptible to contusion in this type of injury.

The chief symptom resulting from this inertia of the brain is an instantaneous interruption of consciousness. This is due to a mechanical derangement of the molecules within the nerve cells, brought about by their acceleration. This may be so severe in some cells as to completely destroy them. The duration of loss of consciousness is the best index of the severity and extent of the cerebral damage. It may be momentary, or last for hours or days. The other symptoms, dizziness, nausea and headache, are the result of vasomotor changes in the brain. Increased intracranial pressure is not a part of the initial pathology. It may or may not develop later. When it does it is due either to edema of the

traumatized brain, or an extravasation of blood into the extra-cerebral spaces, the brain substance itself, or both.

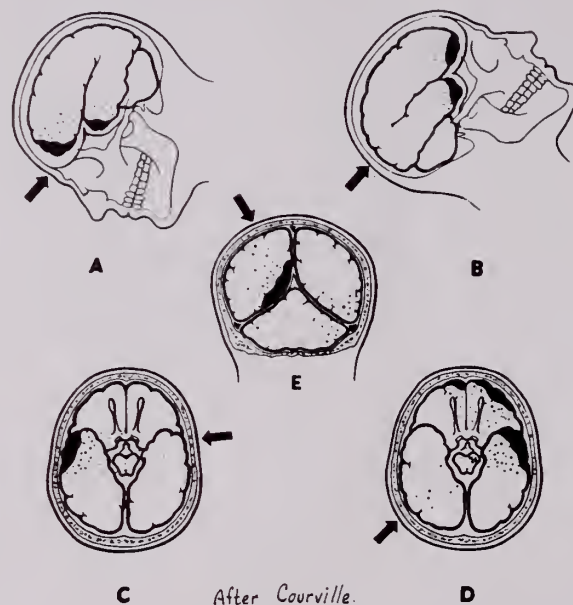


Fig. 1. The mechanism of cerebral concussion and contusion. Arrows indicate point of application and direction of force. Location of contusion: black; petechial hemorrhages: stippled. A. Frontal injury giving fronto-temporal injury. B. Occipital injury with fronto-temporal contusion. C. Temporal lobe contusion from contralateral injury. D. Fronto-temporal injury from blow to opposite temporo-occipital region. E. Diffuse mesial temporo-occipital contusion due to blow on vertex.

It goes without saying that in the treatment of this type of head injury no standardized set of rules can be followed. Every case is an individual problem and its treatment will depend upon the extent and severity of the injury. The length of time the patient is unconscious may be used as a basis for a simple classification of these patients. They may be divided into two groups after excluding the small number who die immediately or within a few minutes of the accident:

Group I includes those patients who are dazed or who are recovering consciousness shortly after the accident.

Group II comprises patients who remain unconscious for approximately an hour or longer from the time of the accident.

In Group I, which fortunately represents about 85% of all head injuries, the old adage of "masterful non-interference" is the best treatment. By this we do not mean the patient should be neglected. On the contrary, he should be observed closely and frequently for the first twelve hours for any change in temperature, pulse, respirations, blood pressure and, particularly, the state of consciousness and ability to move the extremities. Any alteration in these functions may be a warning signal of rapidly increasing intracranial pressure due to hemorrhage. If the accident occurs at night, some one should be given the responsibility of awakening the patient every two hours. In the uncomplicated case the only treatment this group requires is absolute bed rest, with the head kept flat, for a minimum of ten days to two weeks. Aspirin for headache and a mild cathartic are the only medications necessary. The two weeks in bed for any patient who has been rendered unconscious should be insisted upon. Although it may seem an economic waste to the patient at the time it is the only sure prophylaxis against the development of the disagreeable "post-concussion" symptoms of headache and vertigo which so frequently follow these injuries.

It has been around the treatment of Group II, i.e. the patients who are unconscious longer than an hour, that all the controversy and divergence of opinions has arisen as to the correct methods of therapy. Dandy said, "Present day treatment of these patients, taken compositely, is a curious admixture of tradition, of scientific fact and of fallacies which pass under the cloak of science." This group represents about one-tenth of cases. In civil practice the injury is produced usually by the occiput's striking the ground. The patient is deeply unconscious. If the skull is fractured it is often through the base, with hemorrhage from the ear. The spinal fluid is bloody. A few of these cases will die within twenty-four hours from extensive brain damage and intracerebral hemorrhage — a hopeless sub-group. The remainder are hopeful but obviously seriously ill.

It is for the relief of increased intracranial pressure that the various more radical forms of therapy have been advocated. Dandy says, "Operate on 10% of them"—subtemporal decompression. Munro and his followers advise radical drainage of cerebrospinal fluid by frequent lumbar punctures. Fay leads another group who dehydrate the brain (and the patient) by limiting fluid intake, administering large doses of hypertonic solutions, glucose and magnesium sulfate, and doing lumbar punctures. All of these methods may have their merits in se-

lected cases but not as a routine treatment. It has been definitely shown in many large series of cases that most of these patients actually have *no* increased intracranial pressure. Only about 5% will show really high pressures, the rest will be normal, or subnormal! It is only reasonable to conclude that these forms of treatment not only are unnecessary but may even do harm by interfering with the physiology of the injured cells, which are trying to stabilize themselves.

The following plan of treatment has been adopted by the majority of neurosurgical clinics in the country. The changes in temperature, pulse, blood pressure, etc., are closely followed as in Group I. A fast pulse and low blood pressure are grave prognostic signs. The case is almost hopeless if the temperature rises and respirations become irregular. Steadying pulse and blood pressure, smooth respirations and lessening of unconsciousness are encouraging. A free airway to permit unobstructed breathing is very essential. In other words, diligent nursing care is the essence of treatment in this group.

Fluids are administered in quantities sufficient for normal function of body organs at a basal rate, i.e., about 1500 cc. in the first twenty-four hours, 5 per cent glucose being given by venoclysis. If the patient is still unconscious after the second day, a nasal tube is inserted and high caloric liquid foods and fluids, 2400 cc. in twenty-four hours, are given. Vitamins and medication can be given through the tube. If the patient is restless and the cause is not due to a full bladder or a wet bed, it may be controlled by barbiturate drugs or paraldehyde given via the tube. Morphine or other narcotics should NEVER be given to a patient with a head injury! This is one of the most emphatic "nevers" in medicine. No lumbar punctures are done and no hypertonic solutions are given.

After three or four days, the patient may be still unconscious, semi-conscious and restless, or conscious and complaining of severe headache, and examination may show a stiff neck, a slow pulse and a slightly elevated temperature. These are the signs of blood in the cerebro-spinal fluid, and lumbar puncture is indicated. Marked relief is often given and the patient's condition is usually improved by removing 10 or 15 cc. of this bloody fluid. The procedure may be repeated daily until the fluid is clear.

The lumbar puncture may show a marked elevation of spinal fluid pressure with very little or no blood in the fluid. The neurological examination

may reveal progressive weakness of one side and possibly blurring of the optic nerve heads. This is indicative of either an acute edema of the brain, or a collection of blood in the subdural or extradural space. The patient is then taken to surgery and trephine holes made in the skull over the areas of the suspected hemorrhage, determined by the abnormal neurological signs that have developed, or by the site of a linear fracture seen in the x-ray. If a hematoma is found, it is evacuated. If none is found, the patient's condition is probably due to edema. Then, and not until then, should the use of hypertonic solutions be resorted to. Fifty per cent glucose, in 100 cc. doses given intravenously, will shrink an edematous brain and is of value when the existence of edema has been verified as described above. However, if it is given before the trephine holes are made, more harm than good may be done. If the brain is shrunk by the glucose, the subdural space is widened and an existing subdural hemorrhage may be increased.

In general, this plan of treatment is a very conservative one, but in the light of our present knowledge it is felt unwise to interfere with purposeful changes in physiology and pathology after trauma unless the indications are clear and definite.

I Wounds of the Scalp

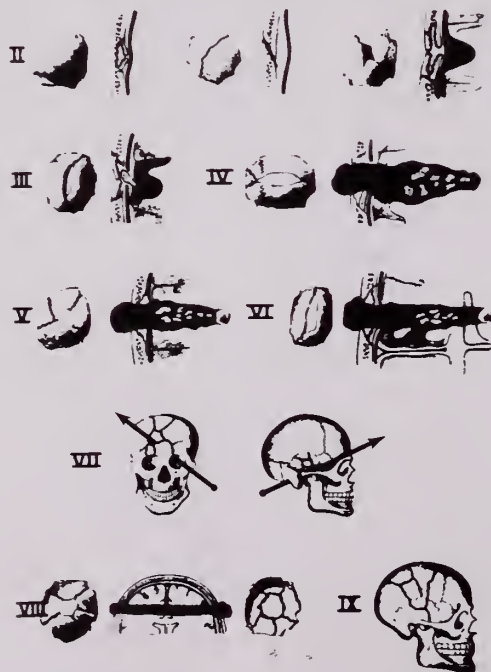


Fig. 2. Clinical classification of war wounds of the skull and brain (after Cushing).

TRAUMATIC WOUNDS

The second type of injury is that produced when the head (which is stationary) is struck by a moving object. The objects may be large, traveling at relatively low velocity, falling objects such as timber, stones, etc., or they may be small missiles traveling at a high rate of speed as bullets, bomb fragments and shrapnel¹. The latter are the wounds most frequently encountered in war.

The pathologic changes in the skull and brain in this type of wound are altogether different from those in the first group. In these wounds the force applied to the head is concentrated in one area. The extent of the injury, of course, will depend upon the size, shape and composition of the missile, and particularly the rate of speed it is traveling. In general, one may say that the maximum injury to the head will be found at the point of contact of the missile rather than at a remote point as in the previous type of injury described. When the missile is very large and traveling at low velocity, the entire head may be set into motion, so that in addition to the local crushing injury produced by the missile there is added the "contre-coup concussion" with its symptoms of unconsciousness, etc. If, however, the missile is small and traveling at a high velocity, the head may be struck and perforated, and the brain penetrated, without the individual's even knowing he has been hit. An acceleration of the brain is not produced by such an injury; therefore, there is no interruption of consciousness. Between these two extremes all combinations of injury may be seen.

Most of the wounds produced in this fashion are compound depressed skull fractures. Their treatment is obviously surgical. The general principles in the surgical treatment of these wounds, as outlined by Dr. Harvey Cushing in the first World War are well known. A detailed description of the technique need not be given here; however, we may list the most important of these principles as follows:

- 1) Removal of all foreign material from the wound.

¹ The growing tendency even among military men to use the word "shrapnel" to mean any sort of flying metal fragment resulting from the detonation of a projectile is apparently going to result in an actual broadening of the meaning of the word. It originally referred, of course, only to the little lead balls, a centimeter or so in diameter, which were packed in projectiles along with a moderate charge of explosive which dispersed them violently on impact or at a predetermined interval after the shell had been fired. The balls were named after the man (Shrapnel) who invented them. Shrapnel was abandoned early in World War I because it was quickly discovered to be vastly inferior to "H.E." (high-explosive) ammunition. None has been used so far in the present war. When the word "shrapnel" is used, almost without exception, "bomb fragment" or "shell splinter" is meant.—Ed.

- 2) Careful debridement of all injured tissue, cutting the ragged edges of scalp and dura and removing with suction the damaged brain.
- 3) Complete hemostasis, using the high frequency electric current.
- 4) Tight closure of wounds, without drains. The large defects in the dura which cannot be closed are patched with periosteum or fascia lata.
- 5) Prevention of infection by thorough cleansing of wound at time of injury; early operation, within 6 hours if possible; generous use of sulfonamide drugs on the initial dressing, in the wound at time of surgery and by mouth ten days postoperatively.
- 6) Minimum of two weeks in bed.
- 7) Anticonvulsant drugs to be taken for at least a year after the injury.

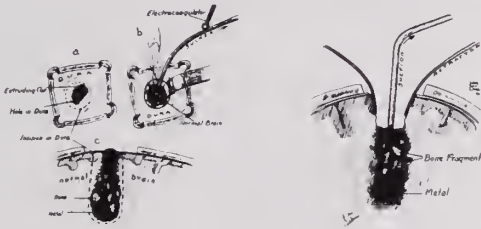


Fig. 3. Procedure for complete excision of the contaminated tract of brain by electrosurgery and the suction apparatus (after Horrax).

CONCLUSION

In conclusion we may predict that the mortality of head injuries as a whole will be definitely lowered if the principles of treatment as herein described are universally accepted and adhered to.

388 Young Hotel Building

DISCUSSION

LIEUT. H. HAMLIN, MC-V(S), U. S. N. R.: Dr. Cloward has shown an appreciation of the compensatory capacity of cerebral physiology to deal with traumatic insult. The primary objective in non-operative care of head injury enacts a fundamental motive of good medical practice—to aid the natural processes of recovery. It is toward better results in the more serious cases, the second group described by Dr. Cloward, that our interest is directed. I add a few statements based on clinical experience with the methods he has outlined.

Increased intracranial pressure and cerebral circulatory deficiency are pathological effects usually associated with the variable combination of concussion—contusion—laceration of the brain. The logical purpose of treatment is to improve cerebral circulation and to restore normal brain volume. Elevated intracranial pressure may occur over a period of hours or days following the trauma and can be determined with certainty only by manometric measurement. Naturally there is no point

in treating increased intracranial tension if it does not exist.

In general, however, multiple lumbar punctures with reduction of increased pressure and removal of subarachnoid red cells, if present, as often as indicated, and limitation of fluid intake to physiological need, has produced the best result I know of in patients with severe degree of injury—namely, a mortality rate of approximately 17% among several thousand cases (Boston City Hospital Clinic) and still more important, a lower percentage of post-traumatic symptomatology in follow-up observation.

The use of concentrated carbohydrate solutions and radical dehydration is not physiologically sound since it taxes an already overburdened vascular and metabolic state in a damaged brain. Roentgen study can usually wait until the patient's condition warrants transportation to the x-ray table. Surgery also in these cases is practically always elective, and like repeated spinal drainage, should be predicated only on definite clinical indications.

It is important to reiterate what has been said about acceleration in brain concussion. The experimental proof that this phenomenon is the principal factor responsible for massive disturbance of neurone function in head injury elucidates as never before the nature of its etiology. It is of small argumentative moment that the concept of molecular derangement of neurones remains a rather nebulous notion that has little correlation with our meager knowledge of the microscopic pathology, because an adequate explanation of the mechanics of a blow on the head has led belatedly to improved means of prevention. Methods to guard against rapidly augmented motion of the skull following a blow on the head are receiving greater consideration in the construction of our fighting machines and in the individual equipment of our fighting men. The same applies with equal importance to the field of civilian defense, in fact, to all human activity of the modern industrial era where the speed and power of a machine supersedes the adaptation of a conditioned reflex.

One of the chief contributions of the present war to frightfulness is the terrific speed and force of its explosive weapons. The aerial bomb, for example, causes cranio-cerebral injuries of a new and different character. In World War I men were concussed by relatively large and slow moving fragments which often compounded through the skull, carrying disastrous infection. In this war the effects of blast are causing us the greatest concern, but paradoxically, the central nervous system appears to be less vulnerable to its destructive force than other organ systems.

Dr. Palma has asked me to discuss the neurological aspect of blast injury. One must first remember that individuals exposed to blast may be thrown against objects or be struck by falling debris, thus sustaining the usual types of head injury. Reliable history is often unobtainable and such injury may be obscured by blast effects on lungs or viscera. Neurological appraisal, therefore, must be done with great care and morphine used with caution.

We shall consider the sailor who was blown through the side of a wooden ship along with his cabin and bunk. Unconscious for four hours, he

remembered the explosion clearly and had no headache or other neurological complaint on recovery but sufficient blast effect, in addition to the lesions demonstrated by x-ray, to cause subcutaneous emphysema of the upper thorax and neck. He did show nystagmus and a bilateral Babinski response when examined twenty-four hours after the incident and these signs disappeared in ten days, but the usual sequelae of brain acceleration were conspicuously absent despite the long period of unconsciousness.

Another man was close enough to a 500 lb. bomb explosion to receive flash burns of the face and neck. His trunk up to the scapulae was partially sheltered by structures surrounding his battle station and his back was toward the blast which he recalls vividly, including the Jap plane that delivered it. In contrast, brain concussion from a solid blow produces amnesia for events preceding the impact, which is an important index of severity. Unconscious for forty-eight hours, this man was treated for shock and given sulfathiazole during sea rescue. Numerous tiny bomb splinters are present throughout the brain and their external perforations can be matched. There was a quadriplegia in extension on admission with complete sensory sparing which has improved to a state of hypertonic paraplegia. Subarachnoid hemorrhage was present and markedly increased intracranial pressure which has gradually subsided. The chest and abdomen were protected from the explosion. His recovery has been amazing. Some acceleration of the brain had undoubtedly occurred, but that the nervous system can survive such an enormous blast is miraculous unless we admit that the force exerted by its complicated pressure system, however powerful and quixotic, has a different and a less damaging effect on the skull-encased brain beyond a certain fatal range than does a solid blow. The kinetic properties of the latter would seem to be negligible in comparison until we consider the extraordinary velocity of the acceleration wave that is set in motion within the brain substance by solid impact.

In this respect the blast wave and the acceleration wave are similar. Apparently the nervous system possesses a better natural armor against the blast wave than either the chest or the viscera.

The severe intra-abdominal, as well as pulmonary trauma, from immersion explosion has been impressed upon us recently, as Dr. Palma has told you, and here again the effect on the nervous system is in even less comparable degree than in atmospheric blast. The survivors had their heads above the surface when the underwater detonation occurred. None of these men showed definite neurological signs but there were instances of pleocytosis in the cerebro-spinal fluid, and in every case this finding was associated with typical pulmonary pathology. Subarachnoid hemorrhage was presumably a result of concussion on the leptomeninges of the spinal cord. There were also examples of disturbed cortical function in some of these patients which we are at a loss to explain adequately. It is further evidence of the total effect of blast injury.

There is one other subject I should like to call to your attention. War experience with sulfonamide therapy has enabled considerable alteration in the treatment of compound cranio-cerebral injuries. In general, patients with such complications, probably excepting fractures through the paranasal sinuses, can safely wait several days for major surgery if sulfanilamide is used locally after superficial debridement, and sulfadiazine internally. The hazard of delay to counteract shock is less, while the time allowance is greater for transportation to a locality where proper operative facilities can be provided.

These remarks on head injuries of the present war are meant to supplement Dr. Cloward's discourse and are offered because of the timely possibilities they may suggest for preventive measures as well as for clinical management.

Orthopedic Wounds

J. D. MACPHERSON, LIEUTENANT, M.C., U.S.N.R.*

The tempo and range in field of modern warfare requires many changes in treatment of orthopedic conditions which were not necessary when sudden evacuation of casualties was not an important factor.

In the event of an air raid we must be able to evacuate our hospitals in a few minutes. If the patient is to be transferred to the mainland he must not be in cumbersome apparatus which will cause difficulty in care and transportation, or prevent quick removal from the ship, should the occasion arise. For these reasons we have almost entirely discarded traction as a method of treatment and substituted open operation with plating, or reduction of the fracture with two or more pins incorporated in the cast.

Early during the raid of December 7 our orthopedic staff contacted the x-ray department and arranged for rapid development and drying of films. As a result of their excellent cooperation, these were soon punched, marked with baggage tags, and tied to the patients' beds. Charts, and all information pertaining to a patient, were also attached to the bed, so that hurried notes could be made. When the patient had been given attention, a large "X" was marked on his bed tag in red pencil. This served to avoid much confusion and unnecessary questioning of the patient.

As we had previously agreed, we used no antiseptic solutions other than soap and water about and in the wounds. We did find it necessary to use a solvent for oil in some cases, since many of the men were covered with thick fuel oil. For these cases we used ether, but we have since been informed of a simpler method. It appears that ordinary mineral oil will cut the heavy coating, and, after its application, soap and water may be used. Debridement was performed under local or spinal anesthesia, taking care to leave no overhanging edges or pockets. Following this, the wounds were generously "salted" with sulfanilamide and a non-occlusive dressing of vaseline gauze was applied. We closed very few of our wounds. Those that were sutured were usually of the incised type rather than the extensively lacerated variety which are produced by high-explosive shell-fragments.

These shell-fragments are extremely hot, and at the first dressing, three or four days later, will

be found to have produced a grayish slough which may be easily removed to reveal a red healthy-looking base. The wound may then be "salted" again, and thereafter be dressed as infrequently as possible.

Extensive lacerated wounds of the extremities and compound fractures were placed in plaster casts as soon as possible, since plaster of paris has decided advantages over any other treatment in these cases.

Immobilization in plaster produces comfort by elimination of reflex muscle spasm, and gives an evenly distributed pressure over the wound. It lessens swelling and edema, and since infection spreads through the lymphatics, it should tend to confine the reaction to the wound itself. For this reason we favor the unpadded cast, as advocated by Bohler, and rather than cut a window for dressings we would apply a new cast. Cutting a window allows the tissues about the wound to herniate through the cast resulting in edema and spread of infection. If one must cut a window, let him use padded casts.

Those fractures which we could reduce manually were reduced immediately after debridement, and casted. Those which were more complicated were reduced later, using pins or wire. We found it necessary in many instances, against our better judgment, to use a pin at one end of a bone and a wire at the other. The wire alone will bend in the cast and allow the fracture to slip unless it can be held taut. However, we were unable to transfer our Kirschner bows along with our patients, due to a scanty supply, and we therefore recommend that a good number of Steinman pins be kept on hand.

It is my opinion that some of these compound fractures could safely be plated, since there is probably no more danger of the screw-holes' introducing infection than the open marrow cavities exposed in the wound. I believe the new Gilfillan plate is well suited to this type of treatment. This plate is of stainless steel and has slotted, instead of round, holes, which will allow impacting of a fracture after it is applied and before the screws are tightened. It is flanged so that a minimum amount of metal comes in contact with the bone. The screws are "self-tapping", and, unlike most bone screws, can be loosened after insertion and re-

* Chief of Orthopedic Service, Naval Hospital, Pearl Harbor.

tightened without stripping the threads. Two plates are applied to the femur, one on top of the other, thus giving great strength. The cast can then consist of an abdominal band with a lateral splint as far as the knee. This would be of great advantage in transportation.

On a recent trip to the mainland I saw these plates used on the tibia in simple fractures. The patient may bear weight on the leg, with the aid of crutches, but no cast is used for fixation other than a moulded splint which is removed as soon as the wound is healed.

The hanging cast for fractures of the humerus has recently become popular. I believe it to be practical for our purposes, since it is easily applied and allows the patient to be up and about. However, it is an ambulatory type of treatment, and if the patient is recumbent it loses its value. It produces traction by its own weight, and control of the fragments for antero-posterior position is accomplished by altering the length of the sling. Pads placed either at the elbow or in the axilla are used to correct medial or lateral bowing.

If a shoulder spica is used it should not be too widely abducted, and the arm should be carried somewhat anteriorly to allow the man to get about and through narrow passageways. Fractures of the forearm are more easily handled, from the transportation standpoint, but end results are often not as good. I have recently acquired an inexpensive traction device which I believe will enable us to perform better reductions. It consists of a metal modification of the old wicker finger traps, connected by pulleys to a metal bar. With the elbow flexed and stabilized, and the fracture point anesthetized, 15 lbs. of pull is exerted for a period of 15 minutes. Most fractures of the lower forearm will reduce themselves in this manner.

For fractures of the femur, we believe the single leg spica to be most useful, since a double spica causes considerable difficulty in transportation. If the fracture be in the middle or upper third, it is well to run the spica to the nipple line to insure immobilization.

An indelible pencil should be used to draw on the wet casts pictures of fragments and wounds, and to give pertinent information. In some cases, we attempted to inform the receiving hospital on the mainland of what we had aimed to do in the treatment of the case. As an example, I have in mind the interesting case of a young officer who sustained a severe wound and a badly compounded

fracture of the left thigh and femur. A large section of the left femur was missing upon arrival at the hospital, probably carried away by the flying fragments which injured him. The soft tissue wounds of the thigh were treated by the surgical service. The patient was then seen by us on orthopedic consultation. We felt that in this type of case, where a large section of the bone was missing, there might be enough of the periosteum left for bone regeneration. Accordingly a Steinman pin was inserted in the upper end of the tibia, the leg was "pulled down to length", and a one leg plaster spica applied for transportation back to the mainland. This information was transcribed on the cast.

I feel that we have gained invaluable experience from our treatment of war wounds. Winnett Orr, whom we must thank for our method of casting compound fractures, still maintains that the principle of physiological rest in plaster is responsible for the good results obtained, rather than the use of sulfanilamide in wounds. In view of the fact that the wounds we received were fresh and were not usually sustained in a grossly contaminated area, and since shell fragments are usually so hot that they have a cauterizing effect, I do not believe we can definitely say from our experience that at last we have reached a chemical cure.

I shall continue to use sulfanilamide, since I feel sure that it is of great value, but I shall not forget the principles of surgical drainage and physiological rest. Since the battle of Midway I am more convinced than ever that these cases must be thoroughly debrided. You cannot count on the sulfa drugs alone.

DISCUSSION

LT. COL. ROBERT C. ROBERTSON: It was my good fortune to serve for a short time on the orthopedic service of a mainland hospital to which our Army casualties of December 7 were evacuated from this department. Practically all of these cases had been initially treated in accordance with principles set forth by Dr. Macpherson. Our entire staff was highly pleased with the general and local condition of these men upon arrival. This condition we attributed to the skillful care received prior to and during evacuation.

Our observations on the orthopedic group were as follows. Wounds in many cases were open. Many of these were definitely infected. This infection was of low grade type without systemic symptoms, and, with very few exceptions, was controlled by the use of Bipp dressings, or sulfanilamide powder covered with vaseline gauze. Split skin or pinch grafts were successfully used to hasten healing as soon as practical, the local criterion being clinical appearance of the granulating surface rather than bacteriologic methods.

Major amputation wounds were open on arrival. Soft tissue flaps for the most part were adequate. Fixed skin stump traction attached to wire loops incorporated into supporting casts were used during transportation. This was of great value in preserving flap length and greatly facilitated plastic closure of the stump wound. The advantage of this procedure for evacuation might be further increased by the use of an interposed elastic device to compensate for the loosening of the traction which occurred in several instances. Plastic closures were performed early by excising en masse all granulation tissue, shortening the bone at a slightly higher level, shaping and loosely suturing the flaps. Stump traction was employed post-operatively. Drains were removed early. In only one case did low grade infection follow this procedure. In this case secondary hemorrhage was also troublesome. Nearly all of the amputees now have their prostheses and have either been given C.D.D.'s or returned to duty. These amputees with wounds open, and adequate soft tissue flaps, were among our most gratifying cases.

Fractures were x-rayed on arrival, and if apposition and alignment were satisfactory, the supporting cast was not initially changed. No case of true infectious osteomyelitis was encountered in these cases, although in several extensively comminuted fractures, spicules and fragment of bone were subsequently picked from the wound. Wire encirclement was encountered in three extensively comminuted fractures. Cases with extensive loss of bone substance have not yet been grafted, although this is contemplated at an early date.

Nerve and tendon injuries were well supported with parts in position of election prior to evacuation. Plastics and nerve repairs are now being done on some of these cases.

A recent personal communication from the present chief of the orthopedic section permits the above statements relating to present status of these cases. His letter reads in part, "The general results were good. I am sure everyone will have to agree that these good results can be attributed primarily to two things, namely; the prompt and skillful treatment received there, and the use of the sulfonamides. All of the cases . . . were given thirty day furloughs and many have already returned to duty."

Experience within the American Army to date, as well as reports from our allies, indicates that orthopedic treatment of war wounds should observe the following principles:

1. Mechanical cleansing of the wound at the earliest possible moment.
2. Loose, wide-open packing of the wound with infrequent dressings.
3. External continuous fixation of fractures by a method which will permit early mobility of the patient, and simplify evacuation.
4. Adequate soft tissue flaps in amputation stumps.
5. Skin grafting at an early date.
6. Delayed nerve and tendon repair in extensive wounds.
7. Sulfonamide therapy.

The detailed methods whereby these principles may be best applied within the theater of operations will largely be governed by time, distance, and personnel. Despite the advantages claimed for any one method, our corner-stones must continue to remain prompt treatment and skillful treatment adapted to the needs of the individual case.

Burns: A Treatment Plan for Large Numbers

PAUL C. SPANGLER, LIEUTENANT COMMANDER, M.C., U.S.N.R.*

The treatment of the occasional burn case offers no real problem. All of you here are familiar with the several different methods of burn treatment. All of these methods have their merits and the intelligent use of any of them will produce good results. Certain situations may best be met by constant wet dressings. The compression dressing, with or without local medication, has the advantage of physiological rest and will be found useful in some cases. Immersion treatment is still valuable, especially in children. Then we come to the various crust formers, such as tannic acid, with or without silver nitrate; the triple dye, composed of methyl-rosaniline, brilliant green, and acriflavine, having specific selective antiseptic actions against the common bacteria encountered; and finally the sulfadiazine in triethanolamine. Any one, or a combination of these methods, may be selected for the occasional case with good results.

A sudden influx of a large number of burn casualties, such as we experienced on December 7, offers an entirely different problem. In such a situation we must have some standardized plan of treatment readily applicable to a large number of casualties, which (1) may be quickly applied, (2) is known to be a satisfactory means of treatment, and (3) can be administered under the direction of the doctor, often by less skilled persons.

At the Naval Hospital at Pearl Harbor on December 7 we treated several hundred burns. Many different methods of treatment were used. We had an excellent chance to observe the results of these different methods of treatment and their applicability to mass treatment. Following this experience a burn committee, of which I was a member, was appointed to evaluate our results, to adopt a standardized procedure adaptable to large number of casualties, and to make provisions for equipment supplies and instructions. We have adapted the report of this committee to our use at Mobile Base Hospital No. 2, and I would like to present this standardized procedure to you at this time.

EXTENSIVE AREAS—SERIOUS

Treat patient first.

For pain and anxiety, give morphine grains $\frac{1}{2}$ and repeat as necessary. Keep accurate record of all medications. An important feature of many of our cases was the extreme anxiety. We believe this is as important an indication for sedatives as is pain.

Put patient to bed under a heat cradle. Elevate

Chief of Surgical Service, U.S. Naval Mobile Hospital No. 2.

the foot of the bed. Avoid chilling. These are just routine measures to combat shock.

Give adequate fluids by all routes. Except in extreme cases, the parenteral fluids should not exceed the volume of plasma given. Caution must be observed in the administration of saline solution as an excess may promote further loss of fluid into tissues.

Give plasma in adequate amounts to control shock and hemoconcentration. Hemoglobin determinations are more practical than hematocrit in the evaluation of the hemoconcentration in a large series of cases. Ephedrine or cortical adrenal extract are valuable adjuncts in the control of shock.

Diet should contain abundant proteins, especially albumin and gelatin.

Continually watch for and treat shock.

Later, after shock is controlled, treat burned areas.
First and second degree burns:

Expose minimal area of body at one time.

Cleanse burned areas, using soap and water. Liquid petrolatum for oil and grease, followed with soap and water. Detergents such as sodium lauryl sulphionate are valuable in cleaning these surfaces. Thoroughly debride all burned areas, removing all loose skin and vesicles. Dry gauze is quite efficient in removing this loosened skin. Narcosis and anesthesia are used if indicated. Usually morphine in liberal amounts is adequate.

Freshly prepared 10 per cent tannic acid solution is painted or sprayed on burned areas. This is followed by freshly prepared 10 per cent silver nitrate, applied with cotton swabs, using a fresh swab each time. It is well to allow a ten to fifteen minute interval between tannic acid and silver nitrate applications.

No dressings. Warm air under cradle. Maximum temperature 85 F.

For hands, feet, face and genitals use 1 per cent sulfanilamide in vaseline. Cover hands and feet with vaseline gauze dressings. Do not change unless infection develops. This should be a bulky firm dressing to provide physiological rest.

Dust sulfanilamide powder where crust cracks.

As crust loosens, cut it away, being careful to cause no trauma.

Oiled paper on the bed will protect the linen and prevent bed clothing sticking to the burn.

Watch for and treat any infection which develops. Cut away the crust and apply sulfanilamide powder.

Record all medications fully.

Third degree burns:

Debride lesions of all charred dead tissue.

Apply sulfanilamide powder.

Dress and treat as an infected wound.

Tetanus toxoid or antitoxin should be given to all serious cases as indicated.

SMALL AREAS—LESS THAN 20 PER CENT

Shock is not a factor. You may proceed with local treatment almost immediately, as outlined for severe burns. Tetanus toxoid or antitoxin should be given to all serious cases, as indicated.

Laboratory work is important on serious cases; red blood count, hemoglobin, hematocrit and serum albumin all give valuable information regarding hemoconcentration and the degree of shock. From a practical point of view, repeated hemoglobin determinations will probably give sufficient information as to the progress and indications for treatment. Serum chloride will be a guide to the indication for administration of sodium chloride. Daily urinalysis and twenty-four hour urinary output are important to detect early evidence of kidney damage and indication for parenteral fluids. The urinary output should be kept over 1000 cc. daily.

FIRST AID

I cannot leave this subject without saying a few words about the first aid treatment for burns. First and foremost is the universal axiom of first aid, "Do no harm." Smearing burns with the first grease handy does harm and must be condemned. Use no grease or ointments in first aid. Tannic acid jelly, with or without sulfanilamide, is satisfactory. Wet dressings, such as a towel moistened with soda bicarbonate solution, normal saline, or even water, is satisfactory. Adequate morphine should be given if available. If facilities for the administration of plasma are available, it might be well to give this medication to seriously burned cases before the patient is sent to the hospital for the ultimate treatment of his burns.

CONCLUSION

We are not maintaining that the method of treatment here outlined is the only, or necessarily the best, type of burn therapy. We are convinced that, based on our experience of treating several hundred cases on December 7, this is the most satisfactory system of handling a large group of burns. The Bureau of Medicine and Surgery of the Navy in April of this year issued a directive recommending this form of treatment.

DISCUSSION

DR. F. J. HALFORD: Dr. Spangler has, in a very thorough manner, covered the principles concerning the treatment of burns. I wish to make a plea, however, that each doctor acquaint himself with the absolute necessity of converting a burn case from a dirty and infected wound into a clean wound. This one factor alone is agreed upon as fundamental in all methods of treatment of burns, and it is perhaps the most frequently overlooked, despite the great volume of writing on the subject.

The burned patient may die from one of three causes: secondary shock, which usually ensues within twenty-four to forty-eight hours; if the victim survives this period, he then may go out from kidney destruction and liver damage; and if still surviving, he may die of secondary infection.

The dread of secondary infection in a burn wound cannot be overemphasized. I do not feel that Dr. Spangler's cases were adequately described, in that "flash" burns produce death usually in such a short time as to give no opportunity for secondary infection to set in.

In any surgical condition where there is so

much confusion concerning the treatment, one readily recognizes that certain principles should be established, and the end results critically compared.

We are all agreed that burn cases must be cleansed and debrided no matter what other form of local treatment is given.

We are all agreed that plasma must be given in sufficient quantities to enable the patient to withstand the onslaught of secondary shock and plasma loss.

I wish to present at this time a modified form of "Triethyl-diazine" with methyl-cellulose as its base, developed by the Lederle Company. This not only allows for rapid drying and formation of an eschar, it also supplies a severely burned patient with sufficient sulfadiazine by direct absorption to take care of the first twenty-four to forty-eight hours. It relieves pain, gives a transparent eschar and is easily removed. There are several drawbacks, however. It must be sprayed on every two or three hours and you may get a toxic absorption of sulfadiazine, and it does not work if you do not cleanse the wound.

It should be remembered that sulfadiazine may be given either in tablet form or as the sodium salt intravenously. These forms of the drug are available in all our civilian hospitals. For local treatment, where there is such a shortage of valuable sulfadiazine solution, I advise the use of three other methods:

(1) Sterile vaseline gauze, applied to the *CLEAN WOUND* (which you have converted from a dirty wound) and bound tightly with roller dressings to act as a pressure bandage. These are left alone for six to ten days. They give excellent results.

(2) Five per cent tannic acid with ten per cent AgNO_3 solution swabbed on the *CLEAN WOUND* until a satisfactory eschar has formed. Under no circumstances should any coagulant be used on the fingers or toes because of the gangrene frequently produced by constriction of these parts. Likewise one should never use this method on or about the face.

(3) Triple dye, consisting of two per cent gentian violet, one per cent brilliant green, and one-tenth per cent acriflavine, swabbed on the *CLEAN WOUND* until a dried and pliable eschar has formed.

As far as the general treatment of burns is concerned, you must give a generous supply of oxygen to take care of the hypoxia and anoxia. We civilians are handicapped here, since we do not have an adequate supply of oxygen.

We should have more generous use of plasma: not 1,000 or 2,000, but as high as 6,000 cc., over a two to four-day period, because we are not going to have time for the falling drop or hematocrit determinations.

It should be remembered that fresh plasma is superior to dried or frozen plasma in that it has not been robbed of many of its essential elements.

DR. BRONSON: I was impressed by the suggestion that we sterilize our burn cases. This is all very well until you have a hundred of them in the field. On December 7 we put on lots of tannic acid but I did not like the tannic acid treatment. We used a considerable amount of sulfa drugs in mineral oil which at least was soothing to the patient and I think we had just as good results as by any other treatment I have seen. The sulfa drugs in oil did not crack like tannic acid and did not give a thick coat and it seems there were fewer infections.

Blast Injury of the Lungs

WITH COMMENT ON IMMERSION BLAST INJURY

JOSEPH PALMA, LIEUTENANT COMMANDER., M.C.-V(S), U.S.N.R.*

Blast injury, caused by the detonation of high explosive, is of increasing importance in both military and civilian medicine because of the development of long-range artillery operations (aerial warfare) of World War II. It is of particular importance to civilian communities, vulnerable as they are to the indiscriminate bombing of large concentrations of people in confined spaces. Prompt recognition of this condition so that proper, early and effective treatment can be instituted is the first responsibility of all personnel charged with the care of war casualties. In these cases, more than with the other types of war casualties under discussion this afternoon, the treatment of shock is the paramount duty of the medical or first aid attendant. Oxygen therapy in particular may be life saving in blast injury.

ETIOLOGY

Blast injury is caused by the positive pressure wave created by the detonation of a high explosive. It is a compression injury which occurs in a fraction of a second, in contradistinction to similar compression injuries observed in civilian life usually occurring over a much longer period of time. The wide variation in the severity of symptoms, course of illness and possibly the complications of blast injury can be explained by (1) proximity to the blast, especially if in a confined space; (2) the fact that the positive pressure component of the longitudinal and excessively intense sound wave produced may be as short as .006 second and can, therefore, strike the individual at any one of many phases of a 3.3 second respiratory cycle during which the unequal enlargement of the thoracic box entails unequal expansion of the lungs, and (3) the youth, size and nutritional state of the individual.

Experimental evidence is offered by the reports of Hooker¹ and Zuckerman² as proof that the positive component of the pressure wave produced by the blast acts externally on the thorax to cause the injury rather than (1) the lowering of alveolar pressure by the negative (suction) component of the wave, acting through the respiratory passages, with consequent rupture of the alveolar capillaries, or (2) distention of the lungs with air. Zuckerman exposed mice, rats, guinea pigs, rabbits, cats, monkeys and pigeons to charges of 70 pounds of high explosives and to explosion of hydrogen and oxygen

in balloons and found that these animals were never killed at distances farther than 18 feet, and that none were ever hurt at distances greater than 50 feet from the explosion. Almost all the animals within 13 to 18 feet were killed. At these distances the positive component of the blast wave varied between 126 and 63 pounds per square inch. However, animals whose bodies were protected with a thick layer of rubber suffered little or no damage. In no animal was there any external sign of injury.

The excellent monograph of O'Reilly and Gloyne³, describing a series of 17 cases of blast injuries to the lung in which the "circumstances of the injury comply with the criteria set up by Zuckerman (1940) in his experimental work as nearly as is likely to be in human cases," and a series of 20 cases described elsewhere⁴ by W. M. Enright and myself, wherein we believe the circumstances likewise comply with these criteria, comprise the material from which these remarks are prepared.

PATHOLOGY

The principal lesions produced by blast are found chiefly in the lungs, central nervous system and abdomen. In the lungs, they consist of hemorrhage, either multiple diffuse capillary bleeding into the alveolar spaces or massive bleeding at the root of the lungs or collected in the costophrenic sinuses with associated rupture of the elastic tissue of the alveolar walls. The lesions of the lung frequently follow the lines of the ribs.

The central nervous system suffers from multiple subarachnoid hemorrhages with possibly an associated molecular concussion from the velocity factor. This subarachnoid hemorrhage is produced, most likely, by the tremendous pressure developed in the venous system from the sudden compression of the thoracic cage.

The abdomen manifests mainly a considerable degree of muscular rigidity resulting either from intramuscular or intravisceral hemorrhage or, more likely, from irritation of the intercostal nerves caused by hemorrhage into their sheaths.

CLINICAL FEATURES

The clinical features of blast injury as presented in the 20 cases observed at the U.S. Naval Hospital at Pearl Harbor after the attack of December 7,

* Medical Service, Naval Hospital, Pearl Harbor.

1941*, were so similar to those described by British authors that we felt justified in our diagnosis even though we had no postmortem proof. In different combinations and in varying degrees of severity they manifested shock, respiratory difficulty, chest pain, cough, cyanosis and restlessness. These men had been in the vicinity of high explosive detonations, often in a confined space; they presented no external evidence of injury; and they were admitted to the hospital within a few hours after injury.

The observer is impressed with the degree of shock, out of proportion to the apparent injury. Pallor, cyanosis, and rapidity and poor volume of the pulse are all striking. Dyspnea is a constant feature; the respiratory rate is rapid, the excursions shallow, and inspiration particularly difficult. Pain in the chest further complicates the respiratory effort, and in our cases it was more often lateral than central. Cough, which may not develop immediately, is spasmodic, frequently intractable and productive of a frothy, blood-tinged sputum. Cyanosis, of course, varies with the severity of the injury. Restlessness is a constant feature and may be extreme. This symptom should not be interpreted as due to psychic trauma but rather as evidence of the irritative lesions (hemorrhage or concussion or both) of the central nervous system.

The physical findings are chiefly in the chest and vary with the severity of the condition. Respiratory excursions are reduced, but generally equal on both sides; diminished air intake is a striking feature. The percussion note may be resonant in the early stages with localized areas of dullness later if complications occur. Palpation gives no additional information. On auscultation, the breath sounds are faint, especially at the bases, and coarse or sibilant rales over the whole of the lung fields are common in all cases.

Roentgenograms reveal characteristic poorly demarcated areas of increased density (mottling) scattered throughout both lung fields, resembling somewhat a patchy pneumonic consolidation.

Uncomplicated cases recover in four to fourteen days but secondary infections are not uncommon, and pneumonia is a frequent complication. Four of our series developed bronchopneumonia with typical signs and symptoms added to the symptoms just described. Response of these bronchopneumon-

ias to sulfadiazine therapy was dramatic and satisfactory. Dosage should be sufficient to produce and maintain a blood concentration of at least 15 mgm. per hundred cubic centimeters. This is easily accomplished by giving the calculated daily maintenance dose initially and following up with the usual 4 hour schedule.

TREATMENT

The treatment of blast injuries is predicated on their early recognition and prompt application of strict bed rest. Then shock should be treated by the usual methods, using plasma transfusions, if needed. Large amounts of fluid by mouth are well tolerated. Morphine, grs. $\frac{1}{4}$ or $\frac{1}{8}$, hypodermically, frequently is the drug of choice to control restlessness and pain. Codeine, gr. $\frac{1}{2}$, by mouth, may be needed in addition to relieve the spasmodic cough. Oxygen is life-saving and should be administered continuously, in the early stages at least, by tent or B.L.B. mask. The rate of flow should be faster than usually employed: 8 to 12 liters per minute. Since these patients may continue to bleed and develop secondary infections easily, they should be moved about as little as possible and bed rest should be prolonged and sulfa drug therapy employed.

Three interesting cases of blast injury — one mild, one moderate and one severe—are here reported:

CASE REPORTS

Case 1. This man was reading in his bunk, partially prone, with the left side on the mattress, the right shoulder elevated and the right leg resting against the bulkhead, when he was exposed to severe blast causing the vivid impression of being bounced about between the bulkheads. Then blackout for four hours, until he regained consciousness. Twenty-four hours later he complained of severe pain in the right hip which was increased on motion of the lower right extremity. There was associated shortness of breath and some slight difficulty in breathing. There was no cough or hemoptysis as far as he could remember. Inspection revealed fullness of the neck extending down over the clavicles anteriorly and extending at that level around to the back. The characteristic crepitation of subcutaneous air was noted on palpation over this area. The man was comfortable and breathing easily, and there was no cough or cyanosis. On percussion there was slight dullness over the right base with a few coarse rales heard on auscultation. There were no breath or voice changes but diminished air intake was noted laterally.

The neurological examination was negative except for a fine nystagmus to the left and definite reflex changes. Tendon reflexes were active in the upper extremities and diminished in the lower, with bilateral Babinski signs, more striking on the right side. These signs were interpreted as evidence of pyramidal tract damage from blast, subcortical in location.

*13 of these were classified as mild and discharged to duty symptom free in 7 days; 3 as moderate, returning to duty in 14 days; and 4 as severe and evacuated to the mainland after two months' hospitalization.



Fig. 1. Typical blast injury effect, involving chiefly the lower 2/3 of the right lung (case 1).

Roentgenograms of the pelvis showed injury to the acetabulum of the posterior and inferior hip, apparently the result of the direct impact of the vibrating bulkhead. The chest showed evidence of typical blast injury, involving especially the lower two-thirds of the right lung with moderate involvement of the left lung and emphysematous areas extending well up into the neck muscles (fig. 1). These findings are easily explained if one remembers the position of the patient when exposed to blast.

No treatment other than bed rest was needed. One week later the patient was asymptomatic. Recovery is to be expected with possibly some reduction in vital capacity. Ten days after injury the subcutaneous air was almost completely absorbed and a roentgenogram of the chest showed, for the first time, beginning resolution.

Case 2. This man was in the immediate vicinity of a high explosive blast and he remembered inhaling an acrid-smelling smoke for a moment or



Fig. 2. Multiple areas of increased density scattered throughout both lung fields (case 2).

two afterward. During the next twelve hours there were no symptoms except slight nausea. Then he noted some pain in the chest and shortness of breath on slight exertion which increased in severity over an eight hour period.

At this period, twenty hours after the injury, he was admitted to the hospital in a state of moderate shock, extremely restless, with shallow, rapid and painful respirations. He was moderately cyanotic and there was some cough. The temperature was 100.6 F., pulse rate 110, and respirations 38. Examination of the chest revealed only a few scattered rales. There was no external evidence of injury. Roentgenogram of the lungs showed many areas of increased density scattered throughout both lung fields. These varied in size but were relatively small and poorly demarcated. There was some confluency of these shadows, particularly in the region of the right middle lobe. The pulmonary findings were reported to be compatible with the after-results of a blast injury (multiple pulmonary hemorrhage) (fig. 2).

The patient was immediately placed in an oxygen tent; fluids were given freely, and morphine sulfate, gr. $\frac{1}{2}$, was given hypodermically as needed for the relief of pain and restlessness. The next day he was worse: temperature was normal, the pulse was 100 and respirations had increased to 50. On the second and third days there was little change in his condition, clinically or radiographically. Improvement began on the fourth day and continued rapidly. He raised a quantity of muco-purulent frothy sputum. On the fifth day he was removed from the oxygen tent, although the respiratory rate was 32 per minute. Clinically he was much improved. The x-ray, however, showed little change. (fig. 3).

Case 3. This patient developed progressive respiratory difficulty after exposure to blast and smoke. He was in moderate shock, cyanosed, coughing and restless, and his chest excursion was very limited. He was coughing up considerable blood-tinged sputum. His chest was hyper-resonant and there were disseminated rales, crepitant to coarse. His temperature soon rose to 102 F. and oxygen was necessary to control respiratory distress. The roentgenogram revealed a light ground-glass ap-



Fig. 3. Same chest as fig. 2, 5 days later, showing some clearing.

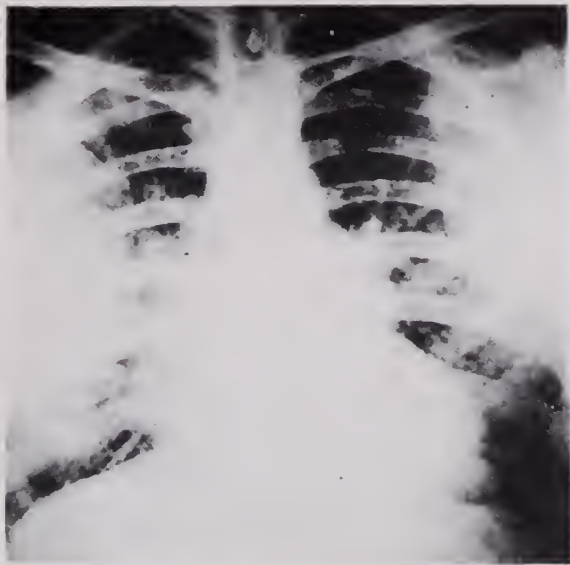


Fig. 4. Intense bilateral mottling of lung fields (case 3).

pearance throughout both lung fields which was reported as a "bronchiolitis."

He was started on sulfadiazine. Morphine sulfate, gr. $\frac{1}{4}$, was given frequently hypodermically.

12-14-41. The patient was in acute respiratory distress with shallow rapid respirations not well controlled even with oxygen. He had numerous, severe coughing spells which responded fairly well to codeine. He was raising a large amount of grayish frothy sputum which on occasions was bloody. A blood count showed 4,150,000 r.b.c. and 8,750 w.b.c. of which 76 per cent were polymorphonuclear neutrophils.

12-28-41. All the aforementioned signs and symptoms persisted. At this time the white blood count was 12,400, of which 70 per cent were neutrophils. The sulfadiazine level was 9.3 mgm. Urinalysis was negative, sputum was negative for acid fast bacilli.

1-1-42. The patient was still acutely ill with signs and symptoms still present. The sulfadiazine level was 14.4 mgm. X-ray showed intense bilateral mottling of the lung fields (fig. 4).

1-4-42. The patient was breathing much more freely and his temperature had become normal. Both objective and subjective signs of acute pneumonic pathology had diminished in spite of x-ray evidence which showed no diminution of the lung process (fig. 5). Sulfadiazine was discontinued.

1-10-42. The patient continued to improve and was up in a wheel chair for periods of one hour.

1-21-42. Six weeks after injury a roentgenogram of the chest showed very little change, although the patient was clinically improving daily.

IMMERSION BLAST

Blast injury occurring in the water has been given the name of "immersion blast" by Surgeon Commander Rex Williams, R.N. Several cases of this type of injury have recently been under ob-

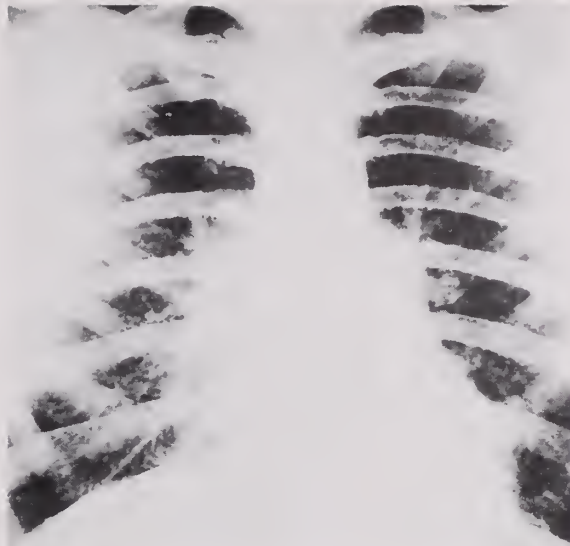


Fig. 5. Same chest as fig. 4, 5 days later.

servation at the Pearl Harbor Naval Hospital. The pathology, unlike that of atmospheric blast, is chiefly in the abdomen.

As was stated earlier, blast wave is an excessively intense longitudinal sound wave, and, in water, sound waves travel four times as fast as in the air. It seems reasonable to assume, therefore, that the critical distance from the origin of the blast is four times as great in the water as on land. It is not clear at this time whether the abdominal injuries are the result of sudden compression of the abdomen or of the transmission of pressure through the pelvic floor and anus, comparable to compressed-air hose injuries seen in civilian practice. It is probably a combination of both factors.

A full report of the type of lesion produced in the abdomen will be made at a later date when all the material at hand has been completely studied, but this much can be stated now: the small bowel is apparently more vulnerable to "blast" than the large intestine. The terminal ileum was most frequently involved, then the cecum posterior wall of the ascending colon. Grossly the lesion produced was a transverse submucosal tear in one or several locations, in some instances extending down to the subserosa. The intestine also exhibited patches of hemorrhage covered by a fibrinous exudate and the omentum. Perforations, when they occurred, were punched-out in appearance and were possibly the result of (1) immediate rupture from compression, (2) interference with the blood and nerve supply, or (3) the increasing pressure and distention of ileus. Rupture of the liver and spleen did not occur.

The presenting signs and symptoms were those of moderately severe shock. This was treated by the

accepted methods: plasma and other fluids intravenously, morphine, heat, etc., with decompression of the abdomen by Wangenstein suction or Miller-Abbot tube. Sulfadiazine intravenously, in those cases where its use was indicated, was of the greatest value. Of the cases admitted to the hospital 75 per cent recovered. The only surgical procedure employed was drainage of a localized abscess in one patient. However, in cases of immersion blast seen early, that is, within the first 24 hours, the surgeon would be justified in opening the abdomen with the expectation of finding the majority of the lesions in the terminal ileum, cecum, and ascending colon.

SUMMARY

1. Blast injury (concussion) of the lungs is of increasing importance, especially to civilian communities.

2. The clinical picture presented by this injury is typical and should be recognized early so that proper therapy can be instituted.

3. In all war casualties, regardless of the type of injury produced, if there has been exposure to the detonation of high explosive, the integrity of the chest should be ascertained by x-ray examination because general anesthesia is contra-indicated when there is blast injury of the lungs.

4. Dr. Hamlin, who will discuss the neurological features of some of these cases, agrees with me that blast injury should be regarded as a "total injury" of a "total war." The outstanding signs and symptoms may be predominantly either in the chest or abdomen depending on the circumstance of their production; i.e., atmospheric or immersion blast. The vascular system is the most vulnerable of the tissues to the effects of blast. Hemorrhage from rupture of the capillaries, either multiple punctate or massive, is the lesion common to all. The less obvious but equally important secondary effects of the injury in the autonomic and central nervous systems add to the complexity of the injury and compel further and long continued observation of the patient.

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DISCUSSION

DR. R. N. PERLSTEIN: The paper just presented is a very complete and careful clinical report on a condition which, while not new, has received more emphasis and elucidation than almost any other in the present war. The author is to be congratulated on a very excellent presentation and his summary of the literature leaves very little to be added.

From the standpoint of the civilian physician who may be called upon to treat such cases, it is well to remember that many, if not most, such cases will not show external lesions of any kind and that a history of exposure within fifty feet of an exploding bomb may not be obtainable. The signs of injury to look for, then, are very important. The patient as a rule complains of tightness in the chest and difficulty in drawing breath. His breathing may be rapid and shallow, or slow and labored. He may have a rapid pulse and low blood pressure. Both of these symptoms may be aggravated by the slightest exertion. There may be hemotysis or cyanosis and there may be thin, frothy sputum. Since not all of these patients need to be x-rayed, it is valuable to remember that a good lead on exposure to severe blast is furnished by examination of the ears. A recently ruptured tympanic membrane usually indicates exposure in the near vicinity of blasts and necessitates a chest x-ray to rule out blast injury to the lungs.

In the most recent of three important contributions to this subject by Zuckermann, a number of interesting points are made as a result of carefully controlled animal experimentation. First, that the death or survival of the patient exposed to blast injury is more closely connected with the amount of pulmonary damage done than with damage to any other tissue. Second, that the exposed person or animal suffers severe bruising of not only the lung but frequently the abdominal organs too, as well as retrobulbar hemorrhage and rupture of the ear drums. Third, that sudden death from blast is usually associated with immediate arrest of circulation and does not depend upon ventricular fibrillation. Fourth, that fall in blood pressure is caused by reduction in the pulmonary vascular bed caused by the trauma of the blast and that any procedure that increases the venous return to the heart is liable to cause further drop in the systemic blood pressure. This is true of compression of the abdomen, exertion, general anesthesia and even blood transfusion so that the latter two are contra-indicated in severe blast injury. Elevation of the inspiratory rate is explained on the grounds of hemorrhage into the lung and patchy atelectasis. Lastly, it is interesting to note that animals exposed in the near vicinity of high explosives with the trunk and thorax encased in a steel cylinder suffered no pulmonary injury, and also, in the majority of instances where there was no skull fracture or cervical fracture, suffered no intracranial injury.

In human subjects, therefore, one must not expect concussive phenomena but must look for clinical signs and symptoms already mentioned which lead to the suspicion of pulmonary and abdominal organ damage. Treatment has been well outlined in Dr. Palma's paper and the only caution it is at all necessary to make is one against the too liberal use of morphine, especially where large areas of lung damage are thought to exist.

DR. LOVE: What difference do the concentration of the sulfa drugs make? I wonder how many men in actual practice or under war conditions are fooling with blood concentrations?

DR. PALMA: I can answer that if you will take your hand off your gun!

It is an accepted fact that there are optimum concentrations in the blood for the different sulfa drugs, but if you have a condition where you are not getting a response and the patient otherwise will die, you had better give him a bigger level. You can give up to 50 or 60 per cent.

DR. LOVE: In how many patients do you change the dosage?

DR. PALMA: There is so much variation in an individual's absorption you cannot follow it without the laboratory. The dosage is many times changed for a given patient.

DR. HAMRE: Do you consider venesection for these blast injuries, where you have right heart failure?

DR. PALMA: The cases we had were not of sufficient severity to consider venesection as a form of treatment but it certainly would be indicated in severe cases where the chest is fixed in a position of partial or full inspiration. Here venesection is a valuable means of therapy.

DR. STEVENS: Among the cases evacuated to the coast, were there any severe sulfa reactions? I have run into one or two in the last two months that were enough to scare a person.

DR. ROBERTSON: In the particular group of cases I saw on the mainland, sulfa therapy had not been carried out during evacuation. I have had severe reaction in previous cases, and feel that the sulfa drugs have great danger and must be used with caution.

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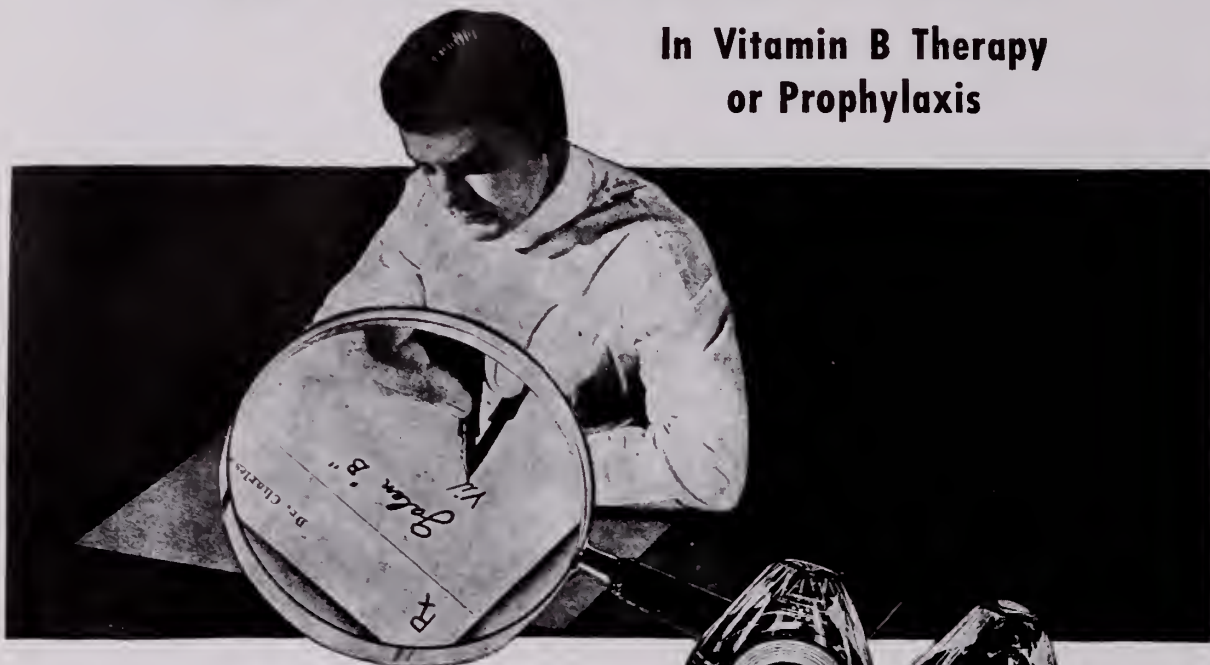
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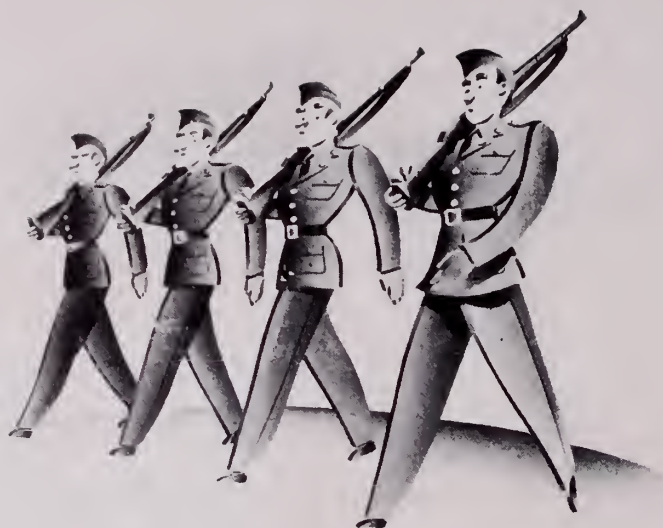
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Typhus Fever in Honolulu¹

CERTAIN EPIDEMIOLOGICAL ASPECTS

JOSEPH E. ALICATA, PH.D. and VIRGINIA BREAKS, A.B.

Honolulu

Cases of human typhus fever in the Hawaiian Islands were first definitely recognized in 1933 and reported by Fennel⁴ in 1934. The diagnosis was based on clinical findings, positive Weil-Felix reactions and protection tests carried out by the U.S. Public Health Service in guinea pigs with the serum of one of the suspected cases. A short time later, Badger (cited by Doolittle²), as a result of guinea pig inoculations, detected the presence of typhus in the brain of local rats; infected guinea pigs were submitted to the National Institute of Health, Washington, D. C., and experiments conducted there showed that the virus was clinically and immunologically identical with their Wilmington strain of endemic typhus. These findings have led to the belief that the form of local human typhus is of murine origin. A discussion of the prevalence and clinical features of this disease in man in the Territory was reported by Doolittle³ in 1938 and 1941.

The purpose of this paper is to report additional evidence regarding the identification of the local human typhus strain, the incidence of typhus infection in rats from various districts of Honolulu, and the epidemiological relationship between the human and murine strains of typhus.

MATERIALS AND METHODS

The local human typhus strain was isolated as a result of guinea pig inoculation with blood of a patient in whom diagnosis of typhus was established by clinical and serologic findings.

In determining the prevalence of typhus infection in rats, 50 to 100 rats were trapped alive in cages in each of several districts of Honolulu (fig. 3). After each animal was killed by gas, the skull was opened aseptically and about one-fourth to one-half of the brain removed. The brain samples of 2 or 3, rarely 5, animals were pooled and emulsified in 20 cc. of sterile physiologic saline solution. Three cubic centimeters of this emulsion were injected by the intraperitoneal route into a grown male guinea pig.

The determination of typhus virus in the fleas studied was made by first washing the fleas in 70

per cent alcohol, and then macerating them in 3 cc. of sterile saline solution. This emulsion was inoculated intraperitoneally into a male guinea pig.



Fig. 1. Guinea pig No. 90, showing scrotal swelling 8 days following the inoculation with the blood of a human typhus case.

Following all these inoculations daily rectal temperature of each guinea pig was recorded for a period of fifteen to twenty days. Animals which developed clinical typhus, i.e. fever and scrotal swelling (see fig. 1), were tested for typhus immunity fifteen days following recovery by inoculating them with a known virulent strain of endemic typhus. Guinea pigs which did not show clinical typhus for thirty days following the brain inoculation, were reinoculated with the known strain of typhus to determine the possibility of having passed through a state of inapparent or subclinical typhus. The known strain of typhus referred to above was secured from the National Institute of Health, U. S. Public Health Service, Washington, D. C., and was maintained by successive transfers of testicular washings from infected guinea pigs to fresh guinea pigs.

1) This study has been carried out from funds appropriated by the Public Health Committee, Honolulu Chamber of Commerce.

The information concerning rat infestation in each residence of the human typhus cases was obtained largely as a result of a questionnaire submitted to each patient soon after his recovery from the disease. The information regarding each residence of the typhus cases reported herein was obtained from records of the Territorial Board of Health.

The dogs and cats which were examined for the presence of typhus virus were obtained from residences where recent cases of human typhus had occurred, and from the local dog pound soon after the animals had been killed by gas. About $\frac{1}{2}$ cubic inch of the brain of each animal obtained from such residences was emulsified in 20 cc. of saline solution and 3 cc. of the emulsion injected into a male guinea pig. In case of dogs obtained from the pound, similar portions from 3 or 4 animals were inoculated into one guinea pig.

ISOLATION AND IDENTITY OF A LOCAL HUMAN STRAIN

On May 17, 1941, through the cooperation of Dr. J. W. McClellan, 5 cc. of blood were obtained from a patient at Queen's Hospital for typhus. The Weil-Felix test conducted on the serum of this patient four days earlier (about one week following the onset of illness) was negative, but on May 19 the test was positive in dilutions up to 1:640. The blood of the patient was injected intraperitoneally into a grown male guinea pig (g.p. 90, fig. 2). On May 25, eight days later, the animal developed fever and testicular swelling (fig. 1). On May 28, it was anesthetized and the testes removed. Smears of the tunica vaginalis stained by Machiavello's method^{*} revealed many rickettsiae. The testes were washed in sterile saline solution, and 3 cc. of the washing injected into the peritoneal cavity of each of the 3 male guinea pigs 105, 106, and 107. After a few days all of these animals developed fever and testicular swelling. Guinea pig 107 was killed, and the typhus strain was maintained by transferring it into other animals; guinea pigs 105 and 106 were retained and were later used for cross-immunity tests.

In order to determine the similarity of the local human strain to that of the local rat and the Wilmington strains of typhus, cross-immunity tests were conducted as follows (see fig. 2): (a) the human strain was transferred to guinea pigs already immune to the Wilmington strain and the rat strain; (b) the

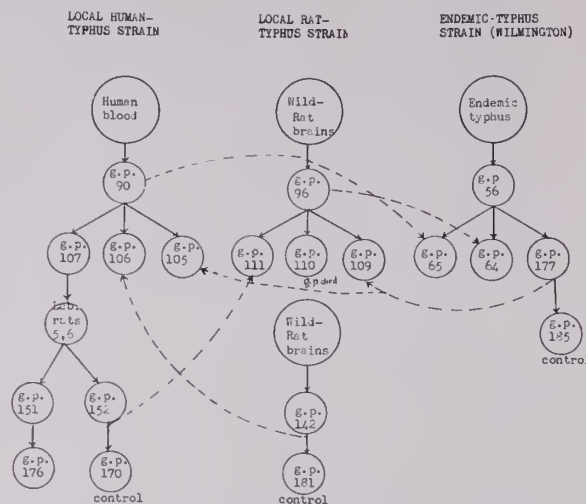


Fig. 2. Cross-immunity tests between the local human and rat strains, and the Wilmington strain of typhus. Guinea pigs 106 and 105, immune to the human strain, failed to develop any typhus reaction when inoculated with the rat strain (from 142 to 106) and Wilmington strain (from 177 to 105). Guinea pigs 111 and 109, immune to the rat strain, showed also complete immunity when inoculated with the human strain (from 152 to 111) and Wilmington strain (from 177 to 109). Guinea pigs 65 and 64, immune to the Wilmington strain showed also complete immunity when inoculated with the human strain (from 90 to 65) and wild-rat strain (from 90 to 64).

rat strain was transferred to guinea pigs immune to the human strain and the Wilmington strain; (c) the Wilmington strain was transferred to guinea pigs immune to the rat strain and the human strain. In the passage of these strains the recipient guinea pigs showed complete immunity as evidenced in their failure to develop fever and testicular reaction. On the other hand, fresh male guinea pigs, which were used as controls during each of the transfers, developed the usual clinical symptoms; these findings demonstrated that the human, rat and Wilmington strains were immunologically similar.

EPIDEMIOLOGIC RELATIONSHIP OF HUMAN AND RAT TYPHUS

As indicated in table 1, 100 rats were trapped from scattered areas of each of 5 larger districts of Honolulu, and 50 rats from each of 2 smaller districts. A total of 600 rats were trapped; 249 guinea pigs were inoculated with the brain tissue of these animals; the emulsion of an average of 2.4 brains was injected into each of the guinea pigs. From all of the brain-emulsion inoculations, 73 guinea pigs developed typhus infection. Since each guinea pig which developed typhus represented at least one infected rat, it can be assumed that at least 73, or 12.1 per cent, of the rats harbored typhus virus in the brain; undoubtedly the rate of infection among the rats was higher since each guinea pig received the brain emulsion of more than

* Machiavello's staining method: Make smear. Fix slide in flame. Flood smear with 0.5 per cent aqueous basic fuchsin with pH 7.2 to 7.5. Stain for 5 minutes. Rinse rapidly with 0.5 per cent citric acid. Wash thoroughly. Counterstain with 1.0 per cent aqueous methylene blue for 1 or 2 minutes. Rinse with water and examine when dry.

one rat. Table 1 points out that the rats from the Kalihi, downtown, and Kaimuki districts showed the highest incidence of infection.

In reporting typhus infection in the brains of rats it is not necessarily implied that the animals were active carriers of typhus when examined. In animals acquiring typhus infection, the virus circulates in the blood stream for a comparatively short time, after which it localizes in several body tissues including the brain. Philip and Parker⁶ were able to recover typhus virus from the brain of white rats 370 days but not 463 days after experimental infection.

As revealed in the present limited survey, considerable difference existed in the degree of rodent infection in the several districts surveyed. This difference may possibly be correlated with that of rodent infestation. Localities with an abundance of old and improperly rat-proofed dwellings, empty and unkempt lots with many kiawe (*Prosopis chilensis*: algaroba) trees, stone walls, and other conditions which offer food and shelter, will undoubtedly maintain a larger rat population than where the opposite is true. In this connection, only a few cases of murine infection were noted in the district of Waikiki, which

appears to possess fewer rat harborage than other areas investigated. On the other hand, a high incidence of infection is noted among rats in the downtown area; this is probably correlated with a high rat population brought about by considerable availability of food and harborage.

Data obtained on the distribution by residence of 202 human typhus fever cases (fig. 3) showed that infection was more prevalent in the Kaimuki, downtown and Kalihi districts, the same localities in which typhus infection in rats was also found to be high. That rats play an important part in the dissemination of typhus infection to man was evidenced by the fact that out of 50 typhus-infected persons questioned in this study, 43, or 86.0 per cent, had seen rats around their place of residence or at work. The information also revealed that the infection took place at home rather than at the place of work, since only 4 (7.9 per cent) reported having seen rats at the place of work and none at home. Of rats trapped in 17 residences where human typhus had recently occurred, infection of typhus was found in rats from 8 (47.0 per cent) of the residences.

Since dogs and cats are known from reports^{1 5} and

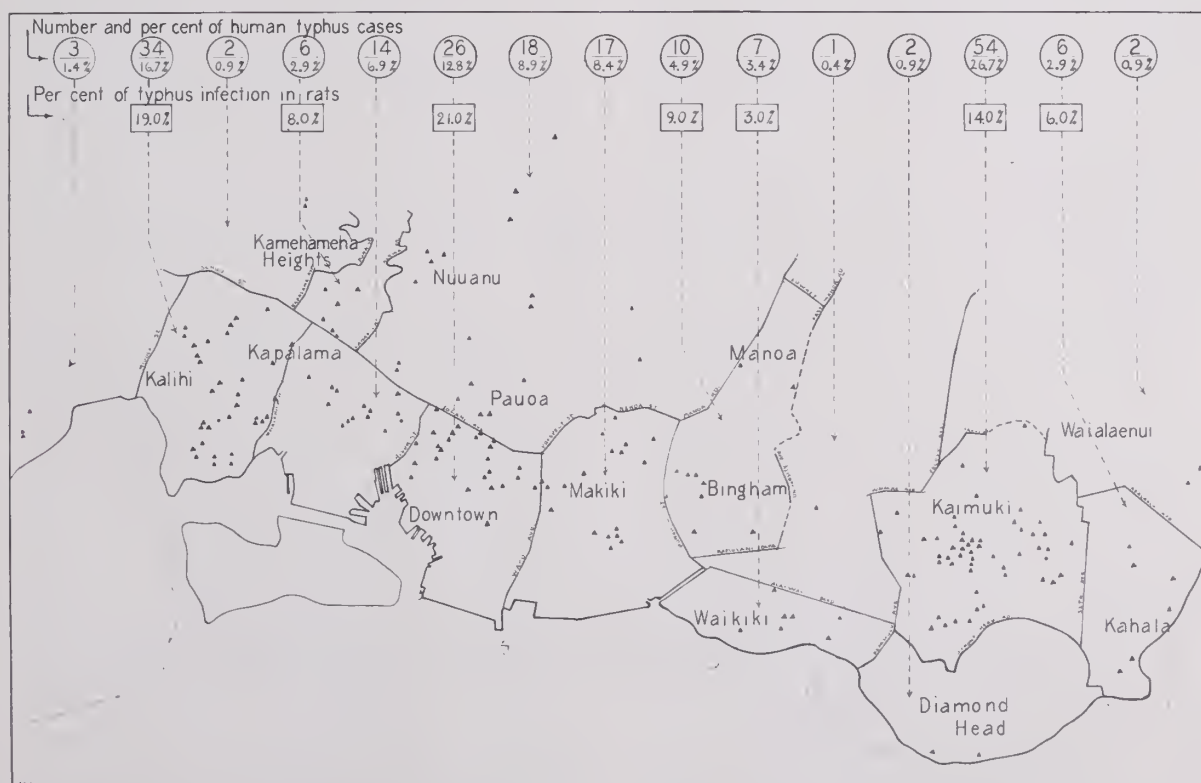


Fig. 3. Distribution by residence of 202 human typhus fever cases occurring in Honolulu during a 5-year period (1937-1941 inclusive) and the approximate incidence of typhus

infection among rats in 7 of the districts surveyed.

Table I. Typhus infection in rats from seven districts of Honolulu.

District surveyed (fig. 3)	Number of rats examined	Number of guinea pigs inoculated with pooled brain emulsion of rats	Number of guinea pigs developing clinical typhus	Number of guinea pigs showing inapparent typhus	Minimum number of rats harboring typhus virus as revealed from the number of positive guinea-pig reactions	
					No.	Per cent
Kalihi	100	40	19	0	19	19.0
Kamehameha Heights	50	21	4	0	4	8.0
Downtown	100	43	21	0	21	21.0
Manoa-Bingham	100	42	6	3	9	9.0
Waikiki	100	42	2	1	3	3.0
Kaimuki	100	40	11	3	14	14.0
Kahala	50	21	3	0	3	6.0
Total	600	249	66	7	73	12.1

personal experimentation to be susceptible to typhus, a study was made to determine possible infection of these animals under natural conditions. As a result of guinea-pig inoculations, no infection was found in the brain or fleas of 6 cats and the fleas of one dog from 4 residences where human typhus had recently occurred. No typhus virus was found in the brains of 109 cats and 26 dogs from various parts of Honolulu. Although these findings do not prove the actual absence of typhus infection under natural conditions, they do point out that the infection is not common and that these animals probably play little part in exposing humans to infection.

SUMMARY

1. A strain of local human typhus has been found to be clinically and immunologically identical with that of local rat and Wilmington strains of endemic typhus.
2. Seventy-three out of 249 guinea pigs inoculated with brain emulsion of 600 rats trapped in various districts of Honolulu developed typhus infection. Assuming that 1 infected guinea pig represented at least 1 infected rat, 73 (12.1 per cent) of the rats harbored typhus virus in the brain.
3. Of rats trapped in 7 districts of Honolulu the highest incidence of typhus infection was found in the Kaimuki, downtown, and Kalihi districts. The same districts also showed the highest incidence of human infection, based on reports of 202 human typhus cases over a period of 5 years.
4. Rat infestation was found in the surroundings of 43 out of 50 (86.0 per cent) human typhus fever cases. Typhus virus was found

in the brain of rats trapped in 8 out of 17 (47.0 per cent) residences where human typhus had recently occurred.

5. As a result of guinea-pig inoculation, no typhus virus was found in the brain and fleas of 6 cats, and fleas of 1 dog, secured from 4 residences of human-typhus cases. Similarly, no typhus was found in the brain of 109 cats and 26 dogs obtained at random from various parts of Honolulu.

The authors wish to express their sincere appreciation to Drs. R. E. Dyer and N. H. Topping of the National Institute of Health, Washington, D. C. for making available the strain of the Wilmington typhus virus, and to Drs. F. J. Pinkerton, M. F. Haralson, J. H. Beaumont and Mr. John A. Hamilton for valuable suggestions and advice in connection with this study. We are also indebted to Dr. J. H. Enright of the Territorial Board of Health for making available reports and material used in this study.

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Psychiatric Problems in Wartime Hawaii

EDWIN E. McNIEL, M.D.*

Those of us who have lived in Hawaii this last year have seen and experienced a great deal. Last fall we saw increased military activity, debated our future and hoped against our reason that the peace would continue. On December 7, we were literally bombed into the most terrific war that man has ever known. On that day our Navy suffered its greatest losses in men and ships since it has existed. Our medical men saw that day the most horrible injuries that they had ever seen. The 1942-kind of war was *here!!* It is truly *total warfare*, and each day every one of us is learning more of what that term really means. It is everywhere—no person is spared and almost no place is sanctuary. It is “*all-out*” warfare—no punches are pulled! The most amazingly intricate, beautifully made war machines involving the science, the brains, the research, the best effort of millions are sent forth—perhaps to be destroyed—perhaps to conquer and return victorious—the deciding blows to be decided in split seconds. Actually killer and killed usually do not know and will never know each other. The future of our lives, our children and the nations of the world depends on such things. It is all a horrible invention of the best and the worst in man.

Aside from the military losses on December 7, there were widespread psychological repercussions. On the positive side it immediately united the nation in the declaration of war on Japan and Germany. On the negative side it caused loss of pride and the creation of doubts and fears. The natural feelings of anger and aggression toward the Japanese and the Germans developed. We continue to see some of this aggression expressed in criticism directed at the leadership in our own group. This runs the gamut: Congress—capitalists—labor — bureaucracy — military leaders—promotion by seniority—the soft life of the age—the deteriorating trends of civilization—the sugar plantations—the kamaainas—the press—and almost everything or anyone that has any power or influence. Most people are mad and scared—and since both of these feelings are very uncomfortable ones they want to do something so that they will feel differently. Unfortunately, from a psychological viewpoint, most people cannot do something directly against the enemy. There is a lot of satisfaction

in giving the “dirty so-and-so” a “sock in the jaw” or in “taking a pot-shot” at a Jap. For most of us this is not that kind of a war. The wear and tear on the personality of the average individual is much greater in this kind of war. There are greater feelings of insecurity because of the speed and intensity of the war and the fact that, as a nation, we are in greater danger than we have ever been in our history. The facts of this situation cannot help but bring some feelings of fear and apprehension to any intelligent person. Any change in the sovereignty of this country would seriously affect the economic and social status of each one of us.

Remarkable changes have come in almost every phase of our living. Food is higher and there is a limited variety. Gasoline is rationed and we are told that rubber for tires will be very limited. The available liquor supply is said to be vanishing like an icicle in a July sun. The blackout has changed our eating, social, entertainment and work habits. The sending of women and children to the mainland has brought about tremendous changes in family and social life and in the sex lives of the remaining men and women. The repercussions of this one situation alone will be evidenced for generations. Many people are frozen to their jobs—others are given jail sentences for refusing to work. Travel is markedly restricted. The high percentage of alien Japanese and Americans of Japanese ancestry in the Territory presents a unique problem both to themselves and to the military authorities. Individually these things are essentially minor; collectively they add up to some importance.

The mention of these well known factors and situations is sufficient to indicate the sources of many emotional and personality problems. Practically everyone in Hawaii during these months has been under considerable emotional tension. It is a normal reaction for the intelligent, sane individual. It may be evidenced in a loss of weight; loss or increase of appetite; increase in rate of liquor consumption; poorer, more restless sleep with an increase in dreams, particularly of the fear or catastrophic type; development of gastro-intestinal difficulties with hyperacidity, gastric ulcers, or diarrhoea; urinary frequency; depressive feelings; unexplained irritability; and other complaints which are best explained as anxiety symptoms. Many people evidence a decrease in efficiency or show in-

* Director, Bureau of Mental Hygiene, Board of Health
Honolulu

Read before the 52nd Annual Meeting of the Hawaii Territorial Medical Association, June, 1942.

stances of remarkably poor judgment as contrasted to their usual even-tempered level-headedness. Others will do things which they cannot explain except perhaps on a neurotic or day-dreaming basis.

It has been our job to examine and treat the majority of the psychiatric patients developing in the civilian population. On the seventh we discharged most of our patients to make room for surgical cases. For three weeks we admitted very few patients and not a single Oriental patient. Since that time our patient load has markedly increased both in number and in intensity of symptoms. In the last six months we have had the most disturbed group of patients that I have seen in my four years in Hawaii. The largest group falls into the schizophrenic classification with the catatonic and paranoid types predominating. Many of these patients are found to have been making a marginal adjustment before the onset of the war. The increased difficulties of adjustment under wartime conditions have been greater than the individual was capable of meeting successfully. Furthermore, a stricter check and demand for higher level of performance has been made by the civilian police, Federal Bureau of Investigation, and the Army and Navy Intelligence Services. Many reports of espionage, sabotage, spies and other forms of enemy activity were traced to schizophrenic and paranoid patients. They reported things that had not happened. We have seen many psychoneurotic patients and a number of cases of major hysteria with aphonia or paralysis. This type of case was a rarity here before the war. We have seen a number of very severe neuroses, generally with hypochondriacal trends, particularly in Japanese. The most pertinent finding is the adynamic character of the illness—the apparent lack of any immediate obvious cause.

In contrast with public opinion, we have seen relatively few alcoholic patients in the last few months. During the period of prohibition we saw more alcoholics and more patients with delirium tremens. Generally they had obtained their alcohol from irregular sources — such as bay rum from Kress', or Vitalis.

About two-thirds of our patient load has been composed of malihinis, and the men are in the majority. This group has presented a wide variety of reactions. The men are usually defense workers who have been brought here from the mainland. Some are old mental patients who have escaped or been paroled from mainland mental hospitals. Some are psychopathic personalities who are typical nomads with a colorful and varied history of previous exploits, including criminal records, sexual irregulari-

ties, irresponsibility, frequent work changes, lying and inefficiency. Others are rural, small-town, home boys who have never been away from the protection and security of a familiar scene. Life here may become too complicated and difficult for them, requiring more give and take, stamina, and flexibility than they are capable of giving.

Another group shows strong paranoid trends with delusions, hallucinations and a typical panic state. Often these individuals have not had a previous mental illness and may have made a fairly satisfactory adjustment in their former situation. They usually have strong latent homosexual trends which may have never been expressed overtly. Placing them in close proximity on shipboard or in bunkhouses with large groups of men precipitates the illness. Usually under these circumstances there is considerable talk of sexual topics. Some of these stories may be directed at the individual, or he may think that they are; or some overt homosexual in the group may actually approach him requesting relations. Other situational and psychological factors may aid in precipitating the illness. One of the outstanding peculiarities of psychiatric practice here is the limited number of manic depressive psychoses. The war has not changed this. For the purpose of the record, let me state that we have not made a diagnosis of war neurosis or war psychosis since the onset of the war. Nor have we seen any patients with what some are prone to call "shell shock."

A few cases of organic psychoses have appeared. Some individuals who arrived in the Islands to do fairly important jobs were found to have general paresis on examination. Some cases of toxic psychoses have been seen. The most dramatic of these have been the cases of alcoholic hallucinosis occurring several days after the individual had stopped drinking, perhaps at sea on a boat where no alcohol was available.

After we arrive at a diagnosis we attempt to treat the majority of our cases. This treatment consists of doing anything available which we think will help the patient. We attempt to build up his physical condition, and to provide psychiatric nursing care, generally on an open hospital ward with the surroundings as pleasant as we can make them. If it is indicated, we order physiotherapy in the form of massage, prolonged baths, wet packs, cold showers or outdoor games. We use insulin and metrazol shock therapy wherever we feel it is indicated. We give out-patients a generous portion of occupational therapy in a department where there is usually a trained registered psychiatric occupational therapist for every eight or ten patients. Here the effort is to individualize the treatment and to provide activity

that is indicated by the psychiatric findings. The psychiatrist usually sees the patient daily for psychiatric treatment interviews. Here the patient has an opportunity to talk about his problems with an understanding friendly doctor, to gain insight into his difficulties and the nature of his illness and to make plans for the future management of his life. This approach must be individual; it must consider the total individual; it must be skilled and experienced and it must be done by a psychiatrist trained in modern dynamic psychiatry. Under such conditions a majority of these patients recover sufficiently to return to the community and fulfill a useful function or to travel unaccompanied to the mainland and return home. The average length of stay of a patient in our clinic is less than two weeks. Our percentage of readmissions is not higher than that of average psychiatric clinics.

There are one or two points that I would like to make. First, mental patients are sick as a result of a variety of factors and they are sick with a variety of mental illnesses. There is too much of a tendency to place all patients showing mental symptoms or personality difficulties in one category and to immediately believe that they are untreatable and incurable. Modern psychiatry grew out of the first world war. Modern psychiatry is treatment psychiatry—it is examining, studying, formulating, treating and doing something with and for mental patients. It produces very real results. It is to be distinguished from the 1890, Kraepelinian, diagnostic, old-fashioned state-hospital type of psychiatry which was content with placing labels on patients and shaking heads over the sad outlook.

The crux of the success of the newer approach is to start treatment early in proper surroundings with an adequately trained staff. It is a teamwork job requiring psychiatric nurses, occupational therapists and others in addition to the psychiatrists. It cannot be done in a ward resembling a jail.

So much for our experience with the civil population and our methods of handling them. I would like to suggest several steps which would help the situation:

1. *More careful selection of defense workers on the mainland.* A properly qualified psychiatrist could eliminate many of the individuals who become psychiatric casualties under existing arrangements.
2. *A more satisfactory labor-relations program between contractors and employees* would lessen the human wear and tear and increase morale.

3. *Improvement of living conditions and recreational programs for defense workers.*
4. *Increase the facilities and personnel presently available for the care of psychiatric cases in Honolulu.*

I would like to ask your indulgence for a few minutes in a consideration of the psychiatric problems among the armed forces. We have seen, as patients, officers and men who have come to us on their own initiative for examination and treatment; and we have seen others at the request of officers or government officials. Nothing that I have to say in this regard is said in the spirit of criticism, but rather in terms of our scientific interest in these problems and in the hope that it may aid in the defense of our country. It is our impression that there exists in some military organizations, among the line and medical officers, a lack of appreciation of the importance of the minor personality disorders, such as the psychoneuroses. Patients of this type come to us with the story that they have reported their difficulties only to be told "aw, forget it" or "you're crazy" or to be given some medicine which is obviously not a specific. The impression seems to exist that personality problems only become important when they have developed to the stage of major psychoses—at which time they call for drastic measures usually resulting in evacuation. This attitude is allied with ideas that most patients with mental illness are malingering or that "if you can't take it we don't want (or need) you;" or that once a patient shows any evidences of a psychiatric disorder, he is "washed up" and his usefulness to the military is over. None of these attitudes is completely correct or scientifically accurate. Some of the most valuable people in any organization show personality deviations. The so-called mythical normal or perfect individual does not exist. We all have our margins between adjusting to situations in a normal or usual manner, and showing evidences of personality dysfunction. Many a very well adjusted individual has shown profound psychiatric symptoms with delusions and hallucinations on a toxic basis with some infectious disease or in exhaustion states, only to recover later and perform at his previous high level. To maltreat, or arrange for the discharge of, such a patient during his illness brings about an unnecessary loss of manpower. On the other hand, patients with proven psychopathic personalities or deep-seated neuroses unresponsive to treatment, schizophrenics with poor personality resources and previous poor life adjustment, and homosexuals of the constitutional type should be ushered out of the services in the best possible shape with adequate recorded evidence, lest their sickness call for a long time drain on the

government pocketbook. An example of the policy to which I am referring was the case of an intelligent well-intentioned constitutional homosexual who found it increasingly difficult to live on shipboard with a group of men without indulging in sexual relations, yet was told that he could not get a change of duty or release except by committing an act and getting court-martialed.

In the last war we found that psychiatric problems became very important. This applied to the morale of the armed forces in general and to the management and treatment of the individual psychiatric case. One-third of our casualties in the first World War were psychiatric cases. Our government is still paying out a tremendous sum of money each year on the psychiatric casualties of the last war. England has found in the present war that prompt and early treatment of psychiatric cases by qualified personnel pays good dividends. The point I wish to make is this: It is apparently the policy of the military not to treat psychiatric disorders in Hawaii. We believe that the immediate and adequate treatment of psychiatric disorders is just as important as the early treatment of wounds, burns, fractures or any of the other war casualties. Early, proper, and adequate treatment will return many of these pa-

tients to duty, prevent long-time chronic mental illnesses and, on the other hand, remove from the combat zone chronic personality deviants who cripple the morale of the group or absorb, uselessly, the time of officers. These thoughts are given in all sincerity as suggestions for consideration.

I believe as you do that we are going to win this war. I like the United States and I like Americans. There are a few things that are not perfect and there are a few people whom I do not like. However, I don't know of any place or country that I like better. We believe in the square deal for everybody and the guy who is in trouble can get a lot of help. We have brain, ability, common sense and great resources in men and materials. However, the task is great and it will be necessary to develop and conserve the morale or mental health of the armed forces to the highest degree possible. I believe that modern psychiatry has a contribution to make in this field. It is only through intelligent consideration of the needs and functions of the individual that we can keep a maximum number of men functioning at a high level of personality efficiency. America possesses greater skill and knowledge of how much of this can be accomplished than any other nation. I have faith that our leadership will call upon this knowledge and skill.

Venereal Disease Control

A BEDTIME STORY

ERIC A. FENNEL, M.D.

Honolulu

Once upon a time there was a little American city completely surrounded by soldiers, sailors and salt water. This little town was peculiar in its geographic location, which had advantages and disadvantages. Its people, too, were peculiar. They were made up of the usual proportion of churchly people, some inclined to stick their noses into other peoples' business and morals, others content to occupy their spare time in the worship of God. There was the usual complement of the rougher element, with toil as a background, and a hearty, robust way of living. The bulk of the population was made up of the great American middle class, that lived rather decorously and minded its own business. Beside these, however, was a very large number of soldiers and sailors, and then too, besides, many young unmarried men who had come in to work on the plantations. Youth will be served. The churchly moralists might preach and cajole and exhort all they wanted to; a man was a man "for a' that and a' that." The long arm of the law could reach out and scatter the prostitute to the four winds—but a man was a man for a' that, and he found her when the wind died down.

This little city acquired an undeserved reputation for lasciviousness, for being "wide open," for encouraging sexual irregularities, and for voluptuous abandonment. One naturally supposed that this large body of soldiers, sailors and laborers would acquire venereal infections at a very high rate, in spite of the venereal prophylactic stations which the armed forces maintained, here as elsewhere. This, however, was really not a fact—among the military, the local rate was somewhat less than that for all the other military forces of all the United States. For many years that difference was not very striking. By looking at the pictures I have drawn you will see that for the years 1921 to 1928 inclusive, the rate was only slightly lower. But after that, if you have been properly refracted, and are not refractive, you will note a very decided fall in the local rate. To be sure, the rate of the Army, as a whole, had also fallen in a gratifying way, but if you will remember that the lines follow the *rates per thousand*, (not total cases) you must acknowledge that the fair little city had something worth investigating.

All statistics are liars, of course, and I do not believe any one would care to ascribe the decrease graphed in these statistics wholly to the improved personal morals of the military personnel—that the fall is due to that, *in part*, and *in part* to greater intelligence and education, I think no one will gainsay.

It is obvious, then, that something happened in about 1928 to alter the picture most decidedly. That was about the year that Somerset Maugham glorified Sadie Thompson, her missionary friend and the mountaintains of Nebraska. But that could not have been the reason. The gonococcus, the treponema and the Ducrey bacillus may have simultaneously lost their infectivity, but that seems hard to believe. The vigorous antivenereal propaganda had not yet emanated from Washington. The words syphilis and gonorrhea had not yet become parlor and class-room words. The local police department had not suddenly improved—as a matter of fact, it was at that time rapidly slipping toward the abominable conditions which in 1932 necessitated a complete reorganization. No highly efficacious prophylactic vaccine for syphilis or gonorrhea had been discovered; the sulfonamide compounds had been synthesized but were still chemical curiosities, not practical prescriptions. My friend Petersen* could probably correlate the drop with changes in the weather or in the condition of the sun spots, but despite our friendship I would still be skeptical. Many theoretical answers might be offered beside the simple one of coincidence.

It would seem a pity not to record the observations and opinions of one who watched this change at close range. It is hard to distinguish between fact and fancy, between truth and rumor; and the following would not and could not be offered as sworn testimony in court. It is only our understanding of the situation, and we have sincerely tried to understand it, without preconceived or personal bias.

Let us take the situation as we saw it, or thought we saw it, in 1923. There were many—some estimated ten, others twenty-five — houses of prostitution scattered about the town; all were miles from mili-

* William F. Petersen of the University of Illinois Medical School, author of *The Patient and the Weather*, Ann Arbor, Edwards Bros.—Ed.

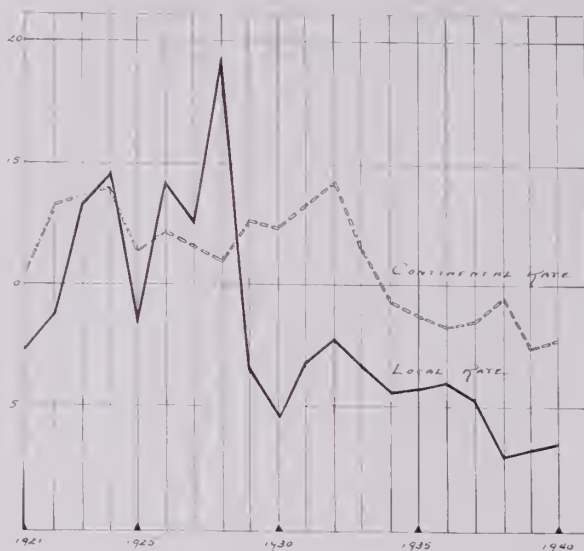


Chart 1. Tabulated comparison of the rates per thousand for syphilis in soldiers in continental United States and the local rates, 1921-1940, inclusive.

tary establishments. Certainly the police knew, but they closed one eye so long as the prostitutes did not disturb the peace. Whether the cop on the beat took graft for this or not, no one knows. Clandestine and amateur prostitution was widespread in the parks. There was little if any medical supervision of these prostitutes, and they may have remained infectious for many weeks. Little or no effort was made by either civil or military authorities to trace the source of infections. Civilian statistics were not worth the

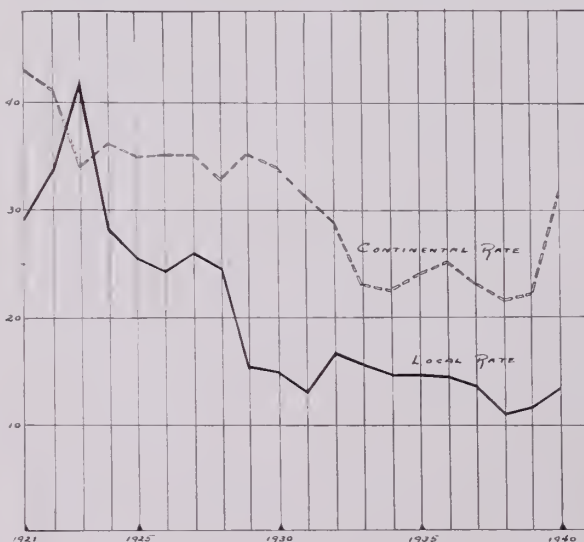


Chart 2. Tabulated comparison of the rates per thousand for gonorrhea in soldiers in continental United States and the local rates, 1921-1940, inclusive.

paper on which they were written. There was a military prophylactic station but it was a long distance from the houses of prostitution, particularly if the path was made devious by alcohol, as it so frequently was. Let me stress that *long period between contact and prophylaxis*, no matter how efficient or rigorous the latter may have been. The marvel is that the local rate, in the Army, was not consistently higher than in the Army at large.

As you will note, from the pictures I have drawn, something happened to venereal diseases in 1928, and it continued to happen. The Army, as a whole, has an enviable record, as depicted by the upper line, but if it could acquire the honor of the lower line—our little City's—that would be something indeed, even at the expense of preconceived notions of policy, morality, expediency—what not.

I asked a kamaaina* here if he could account for that sudden—and maintained—drop in our venereal rate; he raised his eyebrows, smiled a broad grin and said, "Sure; but don't quote me."

Quote: "About in 1928 there arrived on the scene an officer of the Military Police who gave one the impression of a 'flat-foot' with previous experience in practical police work. He was hard-boiled, but very understanding of the young soldier. At about the same time, the Medical Corps seemed to have waked up and there was smooth cooperation between them and the Military Police. An effort was

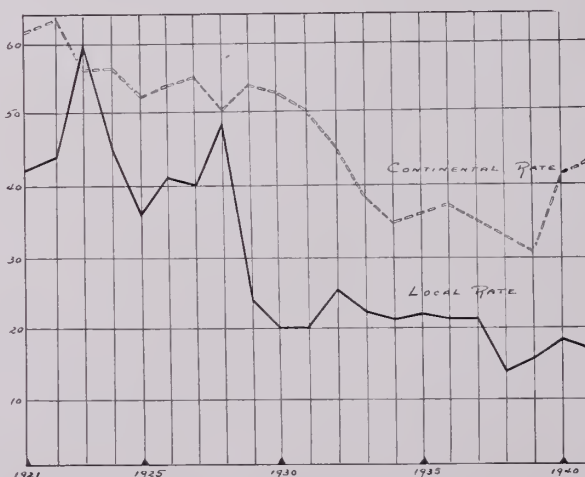


Chart 3. Tabulated comparison of U. S. Army venereal rates (per thousand) for syphilis, gonorrhea and chancroid in continental United States (including Alaska), and the local rates, 1921-1941, inclusive. (From the Annual Reports of the Surgeon General).

made to determine the origin of every case of venereal disease; after the patient had received some treat-

*Old-timer; lit., "child of the land."—Ed.

ment he was taken downtown by the Military Police in an effort to identify the prostitute from whom he might have acquired the infection. If two or three or more cases were traced to a single prostitute, the proprietress was advised to get rid of her. If the madam got obstreperous or failed to take the hint, the house was declared out of bounds, an M.P. was posted at the door, and the house soon folded up, for the sight of the M.P. scared away civilian patronage as well as military.

"This gentle, efficacious, unofficial pressure soon brought ample cooperation from the proprietresses of all the established houses of prostitution, and they made a real cooperative effort to remove any infected prostitutes from circulation; the effort was effective because it was motivated by pure selfishness on their part.

"Shortly after this the local civil police department reached a stage which demanded that it be taken out of politics and turned over to a commission of representative business men of the community. It drafted a very able business executive—with previous Army experience—as Chief of Police, and he reorganized the department most efficiently, before he turned it over to an equally efficient, but professional, police officer. There was thus established close cooperation of the Military Police, the Shore Patrol, and the vice squad of the civilian police. The personnel of the latter was changed at frequent intervals, for the sake of efficiency and to remove any temptation to accept gratuities from the prostitutes or their employers. When the commanding officer of the Military Police was routinely removed, he was replaced by an equally competent man who had married into a prominent medical military family and so had some medical and epidemiological background.

"That was almost an ideal setup: a Chief of Police who could not be bought, quite independent of politics; a police commission made up of men of undoubted honor, sincerity and ability; a cooperative Medical Corps in the Army and the Navy; a Military Police and Shore Patrol who took their unsavory task seriously; and a civilian medical profession which was beginning to take the weekly examinations of prostitutes with a sense of responsibility and to take a like attitude toward the reporting of venereal disease. The civilian health department gave, at least, laboratory and statistical help. Madams became dreadfully afraid that venereal diseases might be traced to their houses and they therefore watched their employees with alertness. The Chief of Police had ruled that there would be no liquor in these houses and that panderers and pimps

were definitely out. And what the Chief said, believe me, went. Of course, prostitution was still unrecognized and illegal, but the sanctimonious moralists recognized that the problem—the necessary evil—was being handled decorously and efficiently, and so remained silent; the baser politicians, who might have profited from a different system, had had their ears pinned back; they could only grumble ineffectually.

"At about this time some unknown benefactor of this community had a happy thought, that made the venereal rate continue to coast down hill at an accelerated rate. He deserves a decoration.

"The efficacy of venereal prophylaxis is directly proportional, not to the strength of the medicaments used, but to the time elapsing between exposure and application of prophylaxis. Some one (how I should like to sing praises in his name) persuaded several of the madams that they probably would get fewer complaints and rarer 'close-ups' if their prostitutes themselves gave their patrons immediate prophylaxis, no matter how drunk or disinclined these might be. It placed an added burden on the prostitute, for her fee of three dollars, but apparently it bore results, for very soon all the established houses made this a fixed rule and the madams quickly fired any prostitute who failed in her duty. Theory is one thing; this was practice.

"Besides soap and water, a number of agents have been employed; potassium permanganate or an organic silver salt solution are popular for intrameatal or urethral injection, augmented by a mercurial ointment for the glans and prepuce.

"Weekly examination, besides clinical inspection, of cervical and urethral smears is the rule. All the prostitutes from one house are examined by the same physician, selected by the proprietress; the prostitutes, however, have free choice of physician for treatment of illness other than venereal. A serologic test for syphilis is required once every three months.

"More recently cultures for gonococci have come into prominence. Their real public health value has not yet been established; in the hands of the inexperienced, the number of positives is fictitiously high, for a number of reasons. New arrivals in the community have cultures of cervix and urethra made at a semi-public clinical institution. The same holds good for those against whom a complaint has been registered. Routinely, they have cultures taken once a month by their examining physician.

"The public health value of these routine smears and cultures is probably very nearly zero, but it certainly makes these women acutely health-conscious, and probably therefore increases the efficiency with which they apply prophylaxis to their patrons. It also increases the income of some physicians, although, by and large, most reputable physicians dislike this sort of practice. Some have carried it on only out of a spirit of altruism and concern for community welfare.

"So there is what I think happened, and you can easily see what I think caused our low venereal rate." Thus spoke the kamaaina, in substance.

Then into this Garden of Eden wandered a politician. He received appointment to the police commission, replacing a man of undoubted integrity and ability. He opened up for public discussion the whole problem of prostitution, was quoted at length in the newspapers, and advocated strict law-enforcement. Since the law failed to recognize the prostitute, she was to be driven out of her accustomed house that was known and watched, into the community at large, where she would be a temptation to the patrolman on the beat and a nuisance to her neighbors. For a while the situation was very discouraging for those of us who had taken an interest in our enviable venereal rate.

His fellow commissioners bravely outvoted him on his policy; he became rather articulate in the newspapers, but the public seemed rather apathetic to his legalistic insistence.

At a most opportune moment the Federal Government called the commissioner back into service and it became necessary for him to resign from the police commission. Whereupon—poetic justice—the former volunteer, temporary chief of police was appointed to the vacancy!

So that was that. The venereal disease rate for 1942 is a military secret. So is the administration of the problem. Up to this time, however, the charts and the tabulation speak for themselves; there can be no doubt but that our venereal rate up to 1942 is surprisingly low. I am convinced that the chief reason for this is that reasonably competent prophylaxis has been applied after a minimum of time after exposure, by the prostitute herself. It goes without saying that the venereal rate in the civilian community mirrors that of the armed forces. Civilian reports are trustworthy for only the last few years, if then, so comparisons cannot be made.

There are two fundamental attitudes toward the prostitute problem: the "Control," as exemplified

in the local situation, and the "Dispersal," as advocated by such prominent persons as Vonderlehr, the Assistant Surgeon General, and his Advisory Committee. They believe in dispersal, in making the prostitute as difficult as possible to find and in that way cutting down the number of contacts; reduced contacts mean fewer new venereal cases, (ipso facto.) This is the method almost universally practiced in the United States at large, particularly near army camps. This probably is more efficacious, particularly against gonorrhea, than no action at all, as witness the decline of the venereal rate throughout the country. However, our system is different, and our rate is much lower. (If one could only say, with assurance, "post hoc, ergo propter hoc.") It is too bad that, for the sake of Science, we could not have practiced, for a time at least, the system advocated by Vonderlehr's committee, to see whether our rates would have risen to the level prevalent in the United States at large—or have been reduced to new unbelievable lows.

This committee (Vonderlehr's) consists of eight physicians and a statistician; the addition of a good, practical policeman might have helped. They outlined and set up a scheme for venereal disease control that would eat up much tax money and admit many tax eaters to the pay roll. Our system is quite cheap.

They say: "The venereal diseases still constitute the most serious public health problem in the development of the national defense program." That may be true, but the figures from the draft boards do not give them overwhelming support. The local draft boards examined more than 12,000 selectees; in that number they found only 158 positive serologic reactors for syphilis (1.3 per cent); there was no primary or secondary syphilis with the exception of one transient—not a resident—who was found with a primary lesion. In these more than 12,000 examined, there were fewer than six recognized cases of gonorrhea.

They say that—as with other communicable diseases—"it is essential that persons who are actually or potentially infected with the venereal diseases should not be permitted to make promiscuous and unrestricted contacts which will spread the diseases to healthy people. This principle of epidemiology applies with the same force in the control of the venereal diseases as in the control of other communicable diseases. The members of this committee, therefore, deplore the practice of toleration and segregation of prostitutes, either clandestine or professional, and urge that the proper repressive steps be taken by constituted police authorities. All health

officers should cooperate with and encourage the police authorities in their jurisdictions to enforce existing laws prohibiting any person from engaging in prostitution or such related activities as procuring, solicitation and assignation."

They present recommendations for a rather complicated proposed method, but offer very little evidence or assurance that it will achieve the desired results. We, locally, have tried a different system, prolonged and persistent; we submit our methods and results for inspection and analysis.

For the sake of Science it may be hoped that one of these inspired attempts to upset the local system of procedure, or to so alter it as to emasculate it, will be put into force, wholly and "all out;" but in the same breath, it is to be hoped that he, she,

or it responsible for the change will be in a position to accept the plaudits for success and will be equally strong to shoulder the results of failure. Pray that it be an admiral or a major general or a surgeon general, from whom we may get trustworthy data—not an inanimate bureau, a group of capital letters, a group of women, or some young whippersnapper with a penchant for passing the buck or dodging the issue if things do not go according to theory. Close every house of prostitution (to really close them will take more than fifty additional policemen) and make one person responsible for the results; that would be a glorious experiment. Those of us who are purely objective will sit on the fence and make notes. When the experiment is over, and the results are properly recorded, our grandchildren may—though they probably will not—profit by the lesson.

Bilateral Dermoid Cyst of the Ovary, Complicating Pregnancy

A SUPPLEMENTARY REPORT ON A PREVIOUSLY REPORTED CASE

H. H. SEILER, M.D.

Paia, Maui

A case of dermoid cyst of the right ovary complicating pregnancy, with strangulation during the seventh month, was presented by the author in the May, 1942, issue of the JOURNAL.¹ The present note is a follow-up report on the same case.

CASE REPORT

On April 25, 1942, the patient, M. N., was uneventfully delivered of a 7 lb. 11 oz. male infant. It will be recalled that laparotomy through a McBurney's incision had been done on January 17, 1942, at which time the strangulated, gangrenous dermoid was removed. However, the left ovary could not be visualized or palpated at that time.

On June 17, 1942, laparotomy was again performed, this time through a midline incision, and for the purpose of sterilization. Upon delivering the left tube and ovary into the wound, this ovary was also found to be cystic, measuring about 3 cm. in diameter. Leaving a small island of normal ovarian tissue intact, the remaining cystic portion was excised in toto and referred for microscopic study. The tube was triply ligated and the patient's convalescence and subsequent course were uneventful to the present time.

The pathologists's report on the left ovarian tissue follows: "The specimen consists of an ovary which measures a little over 3 cm. in diameter. Upon sectioning, numerous small cysts filled by clear fluids were disclosed. One larger cyst, about 1½ cm. in diameter, containing yellowish sebaceous-like

material was found. Section taken through the larger cyst revealed a lining of degenerated tissue and many giant cells of the Langhans type; in the wall were zones of necrosis surrounded by epithelioid cells and lymphocytes; one hair follicle was found. A positive diagnosis of dermoid cyst is possible. (Dr. I. L. Tilden)"

DISCUSSION

Thus, we had evidently been dealing originally with bilateral cysts complicating this woman's pregnancy rather than a unilateral one as appeared at first blush. This adds one more case to the 53 already reported in the literature, as mentioned by Bowles² in his recent articles, and brings the total to 54.

SUMMARY

To date there have been presented in the literature 53 cases of bilateral ovarian dermoid cysts complicating pregnancy. To this number the author adds an additional case, bringing the total to 54.

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Treatment of Tetanus: I

STEELE F. STEWART, M.D.

Honolulu

Although Capt. Mahan, U.S.N., one of the three greatest originators and students of the science of applied strategy, considered his profession the most conservative in the world and the most resistant to change, I feel our own profession of medicine is, if not the equal of the military in conservatism, at least a close second. I am also cognizant of the fact that, just as Mahan has pointed out that changes in naval strategy are wrought only by the energy of "two or three" officers or by major disasters such as Pearl Harbor and Singapore, so medicine has progressed largely through the work of such men as Morton, Lister, Pasteur, and others, or by the opposition of the popular cults of every age, such as the barber surgeons, homeopaths and osteopaths. I am also aware that our profession is afflicted in a way that no navy or army is long afflicted, by men who follow every wind of doctrine—meaning the last article to appear in a recent journal. Each of us must be his own appraiser. It may or may not be a blessing that we as a profession have no general staff of open-minded, experienced men who can collectively pass on and winnow out the chaff from would-be medical literature. I know that some of my own efforts should have blown away. Today as I discuss tetanus I want to do it by deduction rather than dictation. Perhaps we can advance farther and faster by asking ourselves certain questions.

Let us review objectively the disease, tetanus. Briefly, tetanus is a disease caused by an anaerobic organism introduced by wounds or burns, or perhaps even by auto-induction from the cavitory systems. The infection remains localized. The organism gives off an exotoxin generally believed to have an affinity for and to be fixed by nerve or possibly muscle tissue, much as sodium fixes chlorine. The nerve or muscle cells so affected develop a lowered threshold of stimulation so that ordinary stimuli are likely to throw all or a portion of the muscular system into a state of tetanic contraction. The patient manifests little fever, practically a normal heart rate and a clear sensorium. The patient usually dies, in untreated tetanus, from exhaustion, respiratory difficulties, or both.

My recollection is that 10 per cent of untreated tetanus patients survive. The patient who survives

evidently must (a) neutralize the toxin, (b) get rid of the fixed toxin, (c) survive the exhaustion, (d) destroy the source of the toxin.

As physicians we cannot (1) prevent the introduction of the organism, or regulate its habits of immobility and toxin production, or (2) prevent toxin fixation.

As physicians what can we do? Let me quote a medical aphorism that came to me through my old chief, Dr. Robert Lovett. "When considering an operation for a patient ask yourself three questions: 'What am I going to do?' 'How am I going to do it?' 'Is it worth doing?'" By these touch-stones, let us proceed.

Our objective is to restore to fullest usefulness the tetanic patient. "How am I going to do it?"

Obviously the physician should try to neutralize any unfixed toxin or toxin produced hereafter. This would demand a continuing source of neutralizer or antitoxin.

It will be quite clear that when once chlorine has been fixed by sodium, the further introduction of either element will have no effect on the salt that is formed. So then would it be useful to introduce antitoxin into the spinal canal or try to rush it to affected centers through the blood stream if the toxins were already fixed? Such procedures would be irrational.

If I inject the antitoxin around the focus or into the muscles presumably, what do I do? I attempt to shut off for a time the fine trickle of potent toxin before it reaches the fixing tissues.

But someone says—since most of the lesions are on the extremities, why not get rid of the focus for good and all? That, however, violates the principle which we first set down of restoring as highly useful a patient as possible, and since nature does not produce a dry gangrene of the extremities of the patients she saves, perhaps it is not necessary. Perhaps nature's salvation is accidental, so permit me to return to this problem later. Meanwhile, the spigot is closed temporarily by slow local absorption.

Is there anything else I can do? The fixed toxin has produced a set of motor cells, nervous or muscular, that are hypersensitive to every stimulation

from any part of the sensorium. The patient is thrown into convulsions by a banging door, a flash of light, the poke of a needle, or any other unanticipated event. Each convulsion wears out the patient physically and psychically. Would it not seem wise to reduce the irritability? Shall we use ether, or chloroform? Each acts as an irritant before the narcosis is effected, so that would not seem to be the answer. In Dietrich's and my experience the milder barbiturates were adequate. The child would rouse for feeding and permit handling without convulsions. There remains one other suggestion, the use of curare to prevent the muscular contractions without the sensory disturbance. Of this I know nothing.

Now to come back to our surgical friends who want to amputate or excise the focus. Is that worth while? An amputation or excision, even in expert hands, is a fearfully painful thing for days, and it releases innumerable stimuli for long periods of time, tending to cause further convulsions. So I feel that it is not worthwhile, if not definitely contraindicated. This does not mean that foreign bodies should not be removed as gently as possible.

But to come back to the somnolent patient who has had local or intramuscular injections of antitoxin, what is going on? Quietly nature is doing her stint. The body is resting and there is being created a

supply of human antigens, whatever that may mean, that neutralize the poison, destroy the organisms, and remove the fixed toxin. To paraphrase Pare, in quietude I dress him, in solitude God heals.

But what of those who have been poured full of antitoxin—the free toxin is neutralized, but the convulsions go on. Moreover, a foreign protein has been introduced, and in our experience at the Children's Hospital in Los Angeles in from 3 to 14 hours after the beginning of treatment of children who had arrived in good condition, 80% were dead. Of those who came in who had localized antitoxin and *sedation* (reactions only occurred in those who had the intravenous therapy) 92% were alive. It must be remembered that the mortality of tetanus up to a certain point is an inverse function of the age. Yet all our cases were in the most vulnerable age, under 12 years. What was the cause of the deaths? What were the reactions? Was the treatment at fault?

Here were nearly feverless, slow pulsed, bright children with tetanus. Intravenous and intrathecal antitoxin was given. In a few hours their fevers were 105°-108°, the pulse approached 200, the sensorium was clouded. In 3 to 14 hours 80% were dead, with edematous brains and cloudy spinal fluid. We believe heavy intrathecal and intravenous doses of antitoxin are the cause of death in most treated cases.

Treatment of Tetanus: II

F. J. HALFORD, M.D.

Honolulu

It must be accepted that the mortality from tetanus is too high and that the therapeutic use of antitoxin and other forms of treatment have not brought about an appreciable general decrease in the death rate.

An explanation given for this therapeutic failure of tetanus antitoxin is that such an antitoxin cannot neutralize toxin which has been fixed by the tissues. By the time that 50 per cent of patients with tetanus reach the doctor or are diagnosed, they are

already overwhelmed not only by the amount, but also by the state of fixation, of the toxin.

MORTALITY

Every month for the past seven years two people in the Territory of Hawaii have developed tetanus, and one of them has died of it! In a seven-year record the yearly average of cases was 24.4 with 12.5 deaths, a mortality rate of 51.2 per cent.

For the period 1937-1942, in The Queen's Hospital, Honolulu, there were 15 cases with 9 deaths, or 60 per cent mortality; at the Children's Hospital there were 68 cases and 8 deaths, a mortality of 11.7 per cent.

Read before the Honolulu County Medical Society, July 23, 1942.

Hill reported 1,264 treated cases with only 414 recoveries. Dr. Ralph Spaeth,¹ in an exhaustive study at Cook County Hospital, reviewed 180 cases treated by a variety of methods and 96 cases treated by a newer method using mainly barbiturates. The drop in mortality rate from 65 per cent in the 180 cases to 35.4 per cent in the series treated by the newer methods indicates that there is some virtue to Spaeth's therapy.

ANTICONSULSANT MEASURES

Spaeth's comparative series contain much more material than could be adequately briefed here, but sedation is the keystone of Spaeth's treatment. Sodium amytal was used intravenously or by mouth in doses of 5 mgm. per kilogram of body weight with an upper limit of 240 mgm. for children and 480 mgm. for adults. Another drug used was Avertin with amylene by rectum with the catheter left in the rectum to avoid disturbing the patient. The initial dose is 25 mgm. per kilogram of body weight, followed at fifteen to thirty minute intervals with 10 to 15 mgm. per kilogram in accordance with individual needs. In severe convulsions the dosage was raised to 40 or 50 mgm. as original dose.

Dietrich and Stewart² used Seconal both orally and by rectum and found it a satisfactory depressant.

The barbiturates are of themselves a hazard in one respect in that they do predispose the patient to pneumonia even under careful supervision.

Hoche first gave curare to a case of tetanus in 1894 and Cole³ (1934), Mitchell⁴ (1935) and R. West⁵ (1936) each reported series with but mediocre results. Their failures were apparently due to impure preparations or improper dosages. Some of their cases, moreover, were so overwhelmed by tetanus that nothing could have saved them. The only American literature on the use of curare is by Bennett⁶ (1941) and he believes curare therapy offers more possibilities than sedative therapy in controlling tetanic convulsions. The drawbacks of curare are threefold: (1) the drug is transient and must be given in divided doses over a considerable period; (2) the more rapidly it is absorbed, the more lethal it is; and (3) it may cause respiratory paralysis.

The action of curare on the motor end plates, however, prevents any nerve impulses from reaching the voluntary muscles, and this factor alone is a distinct advantage over any other drug we now possess.

Bennett describes a synthetic drug similar to curare in its action, quinine methochloride, and it is effective by mouth.

ANTITOXIN

Many of us in Hawaii have felt that the type of tetanus organism encountered locally is distinctive, and that this difference accounted for the seeming uselessness or inefficiency of tetanus antitoxin. In other words, that the antitoxin supplied to us from mainland biological houses has no specificity against our Hawaiian "strains" of spore formers. In reviewing the literature on tetanus, one is impressed with the near futility of the therapy we have used in the treatment of the disease. This pessimistic attitude should challenge each of us to review his own cases and then decide whether his one victory should be a criterion for all cases of tetanus.

Titration and clinical studies by Spaeth indicate that a single dose of 30,000 units of tetanus antitoxin is satisfactory for active treatment. To allow a liberal margin of safety a dose of 60,000 units is arbitrarily ordered by Spaeth for patients admitted for treatment during the first five days of the disease, and 40,000 units for mildly to moderately ill patients first treated after the fifth day.

Spaeth condemns intrathecal serum treatment because intraspinal and intracisternal serotherapy are disturbances which apparently increase the intensity of the neuromuscular irritability in tetanus. The intravenous and intramuscular routes, preferably the intramuscular, are recommended for general use. For intramuscular injection Spaeth uses the anterolateral aspect of the thigh (not the gluteal region), giving, preferably, half the dose in each thigh. The absorption rate is considerably higher with this technique, and closely approximates the absorption of intravenous antitoxin.

TREATMENT OF THE LOCAL LESION

No remarkable or consistent relation existed in Spaeth's studies between the management of the local lesion and the clinical outcome. *It is the severity of the tetanus and not the method of treatment of local lesions which determines the end result.*

Abel and Hampil have cited evidence which indicates that under no circumstances is one justified in resorting to amputation, excision of a local lesion, or drainage of a purulent collection for the sole purpose of removing the focus at which toxin is being elaborated. They believe such procedures do not influence the course of tetanus either in human beings or in animals after the disease has developed.

McClintock and Hitchings ran parallel series of animals with tetanus and those given surgical care

died in the same time and with the same symptoms as those not surgically treated.

Hence if a fixed toxin has existed in sufficient quantity for a long enough period in the body, then a patient with active tetanus will not be benefited by care of the local lesion. Amputations and similar measures are warranted only when structures appear to be irreparably destroyed.

GENERAL MEASURES

Due care should be given to the careful general management, with stress on constant nursing care, the maintenance of an adequate fluid and caloric intake, and measures to prevent pneumonia.

SUMMARY

A clinical review of Dr. Spaeth's series together with observations of cases in Honolulu shows:

- 1) Adequate and continuous sedation is the essential basis of all therapy.
- 2) Tetanus antitoxin, in doses of not more than 30,000 to 60,000 units gives the maximum titer. This should be given intramuscularly or slowly by the intravenous route.
- 3) The treatment of the local lesion is not the essential therapy when tetanus *has developed*; and under all circumstances one should have full sedation and antitoxin started before attempting local treatment of the suspected wound.
- 4) The suggestion is made that curare may prove of benefit in that it has a specific action on the neuromuscular junctions.

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DISCUSSION

DR. GROVER BATTEN: I am probably old and set in my ways, and I do not agree with much that has been said. I have treated tetanus for a quarter of a century, and the mortality in my cases has been very low. What is the treatment usually? 1) Excision, when possible, of the focus; 2) sedation; and 3)

antitoxin, intraspinally, intramuscularly or intravenously.

I do not know how it can be said that all the toxin elaborated is fixed by the nervous tissue. I suppose there comes a time when it is fixed, but I do not see why in that case it does not get more fixed as time goes on. In cases where you are able to excise the focus (I do not mean amputation) there is an initial improvement, but in the cases where you cannot do this, as, for instance, in combined fractures where you do not amputate, this initial improvement does not occur; they go on with a stormy course, and improvement is more gradual.

I cannot understand a mortality of 80 per cent due to antitoxin alone; there must be another factor. If you give enough sedation, of course, your antitoxin aids your patient more; with less sedation you can expect poorer results. As to the antitoxin, I personally have my doubts as to the efficacy of it. At present I gave one good dose of antitoxin. After that the titre is sufficiently high for three or four weeks to take care of the patient.

DR. JOSEPH LAM: I would like to recall several cases to back up Dr. Batten. A young girl had tetanus, from a criminal abortion, and we gave her 500,000 units of antitoxin; her temperature went up to 106 and 107. We did a curettement, packed her in ice, and gave her sedation. The fever continued for three or four days, so we did a hysterectomy. The results of this cannot be reconciled with Dr. Stewart's statement regarding antigens. She recovered dramatically following amputation of the uterus.

There was the case of a little girl with a thorn in each foot. The doctors at Children's Hospital gave her 200,000 units of antitoxin. A week later improvement was not noticeable; her temperature was constant at 102 to 103 F. When I saw her I spread the wounds apart and out popped the thorns. The child recovered in two or three days.

I would like to ask Dr. Halford how one can leave the foci in the wound and expect the antitoxin or sedation to cure the patient? I treat more puncture wounds, perhaps, than most doctors. My practice is to open the wound and pack it. Whether antitoxin is given or not, I believe is immaterial. As far as I know only one case has died. I follow through and see the wound is healed properly.

DR. HALFORD: I also had a case of amputation of the uterus for tetanus. It was very spectacular. My point is simply that before you go ahead making excisions and amputations, the patient should be given an adequate amount of antitoxin and an adequate amount of sedation. I have seen probably ten or twelve individuals with nail wounds or kuku's¹ in the foot and I am certain if we started excising or cauterizing all such cases we would be doing quite a bit of surgery.

DR. STEWART: It seems to me that Dr. Lam is practicing a type of preventive medicine that has no particular relationship to active tetanus.

DR. ERNESTINE HAMRE: In medical school we start out with a definition of a disease and then discuss its prevention. We had two discussions on tetanus, but nobody has said a word about toxoid. Whether for or against it, I do not think you can disregard it.

¹ Kuku—Hawaiian for thorn.

DR. JAMES ENRIGHT: The Bureau of Communicable Diseases supplies 1500 units of tetanus antitoxin as a preventive measure for deep penetrating puncture have it, and the patient is unable to pay for it. The maximum we allow for treatment of any indigent is 100,000 units, and I think the discussion here has justified that rule.

In 1940 Zinsser showed that every one of 10 different strains produced the same toxin, varying only in amount and in time of elaboration. If tetanus develops in six days the chances of that patient are poorer than in those that develop in forty days. The spores themselves will not develop unless there is devitalized tissue. If tetanus spores are placed in clean wounds it is extremely unlikely that they will develop. If a staphylococcus or some other infection is present, tetanus may develop. It is not the tetanus spore so much as the other organisms. During the war they had tetanus as late as two hundred days after an injury. The wound had healed and the spores were dormant.

ARMY OFFICER: Apropos of what Dr. Enright has said, I can bear witness to the fact that in the last war, where surgical measures were attempted after a wound had healed, for cosmetic purposes or to make the injury more useful, excision of scars and re-amputations resulted in cases of fresh tetanus so frequently that an order was issued by the Surgeon General, that all re-operative procedures on war wounds would be followed by an injection of tetanus antitoxin. The important thing in that order was that it be given before the individual came out of the anesthetic. We discovered that no bad effect was produced by the tetanus antitoxin when given in that way. I cannot give any explanation for it.

DR. WILLIAM WINTER: I would like to ask how many of the cases who died, and how many of those who recovered, had radical excision of the focus or amputation?

DR. HALFORD: Of the two cases that died, one had an amputation of the thumb and one the thigh; they did not have adequate sedation. The other two cases died, I believe, of intravenous antitoxin.

DR. LOUIS HIRSCH: It would seem that tetanus is a self-limiting disease; if we do not excise the focus something happens to the bugs and kills them.

DR. ERIC FENNEL: If the patient lives long enough. In the days when my father was treating lockjaw, about 50 per cent died. Before antitoxin, they used chloral hydrate. We are back where my father was 50 years ago.

DR. HALFORD: I make a plea to the Board of Health and the Honolulu County Medical Society that we give tetanus toxoid.

DR. M. F. HARALSON: The question has been raised as to whether we should start a program of toxoid immunization. If the medical profession would come out strongly in favor of it, it could be undertaken. So far as I know it has never been recommended by the health department as a universal procedure for civilians. I think there is much argument pro and con. Naturally we have to admit that the protected individual stands a much better chance. Whether the condition and the number of cases of tetanus here justifies immunization of the entire population, I do not know. From the standpoint of a public health measure and the expenditure of public funds, there may be some question of its justification in the face of other conditions which produce much higher mortality and morbidity. If the several medical societies will take this question up and give us a definite recommendation the health department might be convinced that it should urge a tetanus immunization program. The Board of Health now actively urges it in children. Our records will show that the incidence is much higher in adults than in children.

DR. JAMES ENRIGHT: Instead of a territorial-wide campaign for tetanus immunization, I wonder what the opinion would be if we used the combined diphtheria-tetanus toxoid? Tests have shown that 5 to 20 per cent of dairy workers are fecal carriers of tetanus, but they have no toxin in their blood. It might be a good thing to look out for tetanus in the treatment of hemorrhoids.

DR. EDWIN McNIEL: Dr. Halford has made reference to experimental work by Bennett with curare. We have a supply of curare at the Mental Health Clinic which we use in connection with metrazol shock treatment. If anyone should want to try this out, we can make it available to them.

DR. WILLIAM SHANAHAN: One of the chief attributes of the barbiturates is their ability to raise the convulsive threshold. Another drug that does this very well is dilantin, and there is a good supply of it in town. I do not think it has been used for tetanus, but it might be worth trying.

DR. STEWART: To go back to Dr. Batten's question: In our first series we used the heavier narcotics. The dramatic thing is that here you have a disease which, left to itself, produces no fever, a slow heart, and a clear sensorium; you introduce a serum and the temperature within two or three hours shoots up to 105 and 108, the pulse goes to 200 and the patient becomes hazy and dies. That is not a tetanus death, that is a death from another cause. When you introduce tea or milk into the blood stream you get that reaction. If you put the antitoxin in around the wound you shut off the spigot and give nature a chance to do her job, and she can do it a lot better than any of the rest of us.

Preventive Aspects of Tetanus

DONALD C. MARSHALL, M.D.

Honolulu

In any discussion of the treatment of tetanus by far the most important factor to be considered is the prevention of the development of the disease. Since one-half of the deaths from tetanus in peacetime occur among children under 15 years of age, the problem is of prime importance to the pediatrician.

The possibility of active immunization against tetanus was first introduced by G. Ramon and his associates, and has since been elaborated by other investigators. Now, seventeen years later, we have a vast fund of information about the efficacy of the immunization, both from the laboratory and from experience in the field.

Probably some of the most enlightening data come from the British Army reports. Prior to the evacuation from Dunkirk, 90 per cent of the British Army had voluntarily submitted to active immunization against tetanus. Some had been immunized as long as two years prior to the battle. A large proportion of the casualties arrived in England five or six days after being wounded, having received neither toxoid nor antitoxin therapy. It is significant to note that among the unimmunized group, eight cases of tetanus occurred, while among the immunized group, a group nine times as large, no tetanus occurred.

Laboratory data show us that, at least among infants and children, a series of two or three tetanus toxoid (alum precipitated) injections, given preferably at two months' intervals, will produce an antitoxin titer in the blood, ranging from 0.1 unit per cubic centimeter of serum (the assumed minimal amount necessary for protection against development of the disease) to 10 units, the time of measurement ranging from five to forty weeks after the last injection (fig. 1).

It has further been shown that over a period of two years this antitoxin titer gradually decreases to a minimal figure but that a "recall" or "booster" injection of toxoid given even years after the original series of injections will cause an immediate response, bringing the antitoxin titer to a figure two

or three times that of the original titer, i.e. as high as twenty to thirty units per cc. Thus there appears to be a so-called "pattern of immunity," or mechanism for the production of antibody, set up in the body,

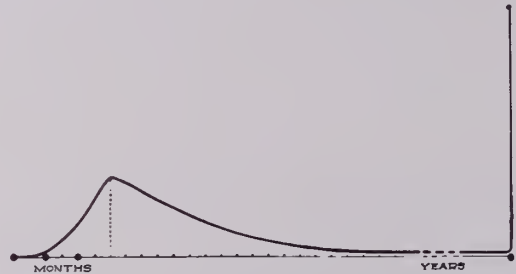


Fig. 1. The rise and fall of tetanus antitoxin after the serum after three injections of alum toxoid and after a "recall" injection of toxoid given years later.

which reacts to subsequent stimuli more rapidly and strongly than the original immunization process. This is known to be true of other types of active immunization, particularly that against pertussis.

The possibility of antitoxin production's being similarly stimulated by the tetanus toxin itself, in a previously immunized individual, is a subject of considerable interest. As yet very little experimentation has been done in this field, and reports are conflicting.

The fact that tetanus immunization can be most satisfactorily combined with other immunizing agents has been and still is being proven. The original combination was that of tetanus and diphtheria toxoids. Now we are getting reports of satisfactory antibody titer responses to the combined tetanus, diphtheria and pertussis antigens.

I should like to conclude with a plea that active immunization be more widely practiced in this Territory, where, due to the custom of not wearing shoes, children as well as adults are more frequently exposed to the dangers of tetanus than the population of colder climates. The present war-time status of the community makes tetanus immunization even more desirable.

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EDITORIALS

SHOULD PROSTITUTION "GO"?

Last summer we pointed with pride to Hawaii's enviably low rate of incidence of venereal diseases, and urged that nothing be done that might increase it. At about the same time, an article in the Hawaii Health Messenger covered much the same ground in greater statistical detail and outlined certain improvements recently instituted in the program of control, ending on a note of optimism regarding the future of venereal disease control in Hawaii.

Recent articles and editorial comments in the local newspapers have referred to a sudden increase in the incidence of venereal diseases here. This "increase" has been viewed with considerable alarm, but no public mention has been made of the possibility that it might be very largely due to the sudden improvement of reporting of venereal cases, under the impetus furnished by the recent General Order that this be done promptly.

The voice of authority both nationally and locally continues to urge the "repression" of prostitution in preference to its control. Whether "repression" means eliminating and abolishing, or whether it merely means scattering and rendering clandestine, any adult American who has had an opportunity to observe national "Prohibition" should be able to guess. An article in a Seattle newspaper last fall described the recent shocking increase in the incidence of venereal diseases there, and ended by remarking that the local houses of prostitution had "all been tightly shuttered for some time," but that the "soldiers and sailors were still acquiring the diseases from the girls they meet in the taverns."

Hawaii's record in venereal disease is, as we have said, an enviable one. It is too valuable a community

asset to be lightly jeopardized. It is for this reason that a detailed account of its background is being published in this issue of the JOURNAL. The problem is an admittedly controversial one, but both the "repressers" and the "controllers" are agreed that no good can be expected to come of half-hearted measures.

If scattered, clandestine, wholly uncontrolled prostitution will cause less spread of venereal disease than organized and more or less controlled prostitution, then let us repress organized prostitution with a will. This failed in Seattle, of course, but perhaps we do not know all we should about the situation there. At all events, let us not merely "monkey with the buzz-saw." Let us either carry on with the present system or change it radically and make the change stick—and then see what happens.

SOLVENTS CONDEMNED FOR REMOVING MUSTARD GAS!

The use of kerosene, gasoline, naphtha, acetone, carbon tetrachloride and similar solvents to remove liquid, vesicant war gases (mustard and Lewisite, e.g.) from the skin has been widely recommended as a suitable first aid procedure. The January 1942 issue of the HAWAII MEDICAL JOURNAL carried an article including this recommendation; countless first aid pamphlets offer it; and it is still officially standard practice in the United States Army, though they unofficially appreciate its potential dangers.

The use of such solvents for this purpose is not only ineffective but actually dangerous, at least under conditions likely to prevail in actual practice.

An article by Chauncey Leake and David Marsh, of the University of California (Mechanism of Action of Ordinary War Gases, *Science* 96:194 [Aug. 28] 1942) reviews work of their own and of other investigators which shows clearly that the use of such solvents on laboratory animals produces about the same result as no treatment at all.

The procedure they recommend is the use of ordinary kitchen bleaches, such as Clorox, Zonite, Purex, Hychlorite, or others. These consist of buffered 3 to 5 per cent solutions of sodium hypochlorite (NaOCl). Their effect on the gas (mustard or Lewisite) is to decompose it rapidly into harmless substances which may be washed off the skin at any subsequent time. Under the conditions of the experiments reported by Leake and Marsh, a strong solution of soap was very nearly as effective as the hypochlorite preparations employed.

The gist of this article has recently been made available in the form of a three-page mimeographed release from the medical division of the Territorial Office of Civilian Defense. It is suggested that all physicians familiarize themselves with this release, or with the original article, or with the officially approved releases by Dr. Hance, in order to bring themselves up to date on the subject of first aid management of vesicant war gas casualties.

THERE AREN'T ENOUGH NURSES!

There is one fact that physicians and hospitals must face—that our civilian hospitals are likely to be seriously understaffed for the duration. Not only is it going to be difficult to recruit nurses, but non-professional attendants and aides are attracted by higher wages to other types of employment. Hospitals, physicians and nurses alike must be prepared to make adjustments and the physician and patient must limit requests for service only to the essentials. It is up to physicians to discourage "luxury nursing" so that the really ill patient will not go without essential care.

There are many things that the physician can do, with almost no inconvenience, that will save hours of nursing time.

He can limit the number of visitors who weary the patient and add so tremendously to the work and confusion on the floors.

He can observe the meal hours and not choose them to make visits and do physical examinations and dressings, especially in the wards.

He can dispense with the presence of a nurse on his routine visits, and still let the head nurse

know when he has told a patient that he can go home, sit up, or discontinue some treatment.

He can drop some of the time-honored routines—four-hourly temperatures for patients whose temperature has not varied in a week, and bedside notes for patients whose condition is so unvaried that the nurse fills in the space with "comfortable day", and a resume of all the medications.

He can discharge patients in the morning and not any odd time of the afternoon or evening.

None of these suggestions is unreasonable; none of them would interfere in the least with the practice of good medicine and surgery. All of them would tend to lighten the load on the nurses and give them more time for their work. In ordinary times it would be every physician's duty as a human being to give them some consideration and to accede to them in so far as possible. *In war time it is every physician's duty as a patriotic American to make a serious effort to comply with them.*

"PROFESSIONAL ADVERTISING"

A letter was recently sent to a number of Hawaii's leading older physicians asking for a biographical sketch for publication in future issues of the JOURNAL. It seemed to us then, and we have not changed our mind, that the propriety of this was beyond question. The project is still on our agenda, and we hope to be able to initiate the series in an early issue.

One of the replies to our request, however presented a point of view so unusual in these times that we felt it worth publishing.

"Briefly answering your letter of September 7, ult.:

I am prohibited from complying with your request for my autobiography by the Rules of the Royal College of Physicians, London, even in a Medical Journal; it comes under the rules against Professional advertising.

The publishers of "Who's Who in Hawaii," also "Men of Hawaii," mailed me blank forms to fill many years ago—I had to reject their request."

There is something refreshing about this view, despite our feeling that its application to biographical sketches for publication only in a medical journal is unnecessarily prim and proper. It is a little like a voice from the dim past. One cannot help respecting the principles of the "old school" which prompted it. To comment further on it would be painting the lily, indeed.

YOU CAN'T GET MALARIA HERE

Malaria is not a contagious disease in Hawaii. It is occasionally imported into the Territory, but only as human cases. The only way these could transmit the disease is by actually transferring their blood to others, for Hawaii has no *Anopheles* mosquitoes.

Hawaii's mosquitoes are of three species only. Our common "day mosquito," *Aedes albopictus*, is a common vector of dengue fever, but the disease fortunately—albeit mysteriously—is practically unknown here. Our common "night mosquito," *Culex quinquefasciatus*, is a known vector of endemic filariasis in the South Seas. While *Filaria Bancrofti* is quite often found in Hawaii, usually in the blood of Samoan immigrants, clinical elephantiasis, like dengue, is virtually unknown here. *Aedes aegypti*, the usual vector of yellow fever, is also found here in small numbers in the daytime near human habitations, but yellow fever fortunately is unknown in Hawaii.

So as far as yellow fever and malaria are concerned, the situations are reversed—with yellow fever the vector is plentiful but the disease is lacking, whereas in malaria the disease is present from time to time but the vector is absent.

That the *Anopheles* mosquito is unknown in Hawaii is not an accident. Before the days of air travel the ocean presented hazards too great to enable the *Anopheles* to come here. Its fatal phototropism always brought it out into the open, where the wind, or its search for forage, took it so far away from the ship that it could not get back. Since the advent of air travel, the only obstacle to the arrival of adult *Anopheles* mosquitoes in Hawaii has been the rigid inspection of all incoming planes. Local officials of the U. S. Public Health Service, the Board

of Health, the Chamber of Commerce, the Hawaiian Sugar Planters' Association and the Army and Navy have been alert to this danger and have cooperated in maintaining a constant vigilance. All incoming planes have been "flitted" with insecticide, and the dead insects carefully removed and examined, identified and classified. This latter work has been done for civilian and military aircraft alike by the entomologists of the Hawaiian Sugar Planters' Association.

With the extension of military air activity a serious hazard has been added. However, the Army and Navy are acutely aware of this and are endeavoring to keep this potential danger under strictest control. Military planes on landing are flitted by trained personnel, just as was formerly done with the Pan-American clippers, and the Hawaiian Sugar Planters' Association entomologists are continuing their examination and classification of insects removed from the planes.

Three adult specimens of malaria-transmitting *Anopheles* have been obtained in this manner within the past six months. One such specimen, had it been a fertilized female, could have infested permanently with *Anopheles* mosquitoes, and thus, inevitably, with endemic malaria. Only those who have lived in a region where malaria is endemic can appreciate what it means, in terms of convenience, public health, and actual lives, to be free of this disease. Its introduction into Hawaii as an endemic contagion would be a catastrophe.

We may well be grateful to those who stand guard over the Territory and prevent this tiny enemy from making a landing. The next time you scratch a mosquito bite, reflect for a moment on the pleasant fact that, thanks to the entomologists, you cannot possibly have acquired malaria as a result of it—yet!



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PROGRESS IN INTERNAL MEDICINE

DIABETES

Etiology

The inter-relationship of the various glands of internal secretion is stressed in modern discussions of the pathologic physiology of disturbed glucose metabolism. Very convincing evidence of this close relationship of the endocrines is found in the work of Haist and Best.¹ They have been able to produce in animals the typical pathologic picture of diabetes, that is, hydropic degeneration of the B-cells of the Islands of Langerhans of the pancreas, by repeated injections of an anterior pituitary extract. Further experiments with rats and dogs showed that fasting, fat feeding and insulin administration prevented progression of these changes in the Islands of Langerhans. This experimental evidence may argue for the high fat diet of former years. The authors suggest that it (a high fat diet) may be useful in children with a bad family history of diabetes as a preventative measure against the development of diabetes in later life. Certainly it gives further proof of the clinical observation that diet-and-insulin-controlled diabetics are usually protected against progression of their disease, whereas the uncontrolled diabetic frequently has progression of the disease.

That the occurrence of endocrine disturbances other than those of the pancreas is rare in humans exhibiting clinical evidence of chronic diabetes is indicated by a study made by Dougherty². He found among 425 diabetics only 64 who showed evidence of endocrine gland dysfunction other than pancreatic deficiency. These, furthermore, did not follow the pattern of the experimental animal. *Hypopituitarism* was more frequent than *hyperfunction* of the pituitary and was associated with more severe diabetes. *Hypothyroidism* was found nearly as frequently as *hyperthyroidism* and adrenal disturbances were not found. The importance of liver metabolism is stressed, however, in modern studies on acidosis.

Acidosis

The work of Mirsky³ casts doubt upon the long accepted thesis of incomplete combustion of fats because of inadequate carbohydrate burning as the cause of diabetic acidosis. Mirsky contends that the essential cause of ketosis is diminution of liver glycogen. Depletion of liver glycogen results in secondary

acceleration of fat-oxidation and consequent secretion of acetone bodies in excessive amounts. Dietary indiscretion is not an important cause of ketosis. Indeed, the administration of large amounts of carbohydrate may improve the condition in certain diabetics. Deprivation of insulin is an important cause since it lessens glycogen deposits in the liver. Similarly, conditions which accelerate the depletion of liver glycogen, such as hyperthyroidism, hyperpituitarism, hepatitis, infection and gastro-intestinal tract disturbances may cause rapid development of serious ketosis in the diabetic.

Treatment

It is twenty years since insulin was introduced as a therapeutic agent in the treatment of diabetes mellitus. Since that time a number of modified insulins have been produced. None has been effective when given orally. The greatest advance since 1922 was the discovery in 1936 by Hagedorn that protamine (obtained from ripe fish sperm) prolonged insulin action by delaying absorption. About this same time Rabinovitch reported that the addition of zinc further prolonged the hypoglycemic activity of insulin. The combination, protamine zinc insulin, is the product in most common use today. Its field of usefulness and its advantages and disadvantages have been quite well established after over 5 years of clinical use. There is still some controversy about its place in the treatment of diabetes, based in large part upon lack of unanimity about aims in diabetic control, particularly as to whether or not consistently normal blood sugars and complete freedom from glycosuria are necessary in the more severe diabetics.

The chief advantage of protamine zinc insulin is that it exerts its hypoglycemic activity over a period of approximately twenty-four hours. It is therefore possible to maintain approximately normal blood sugar levels in many diabetics by a single daily dose of this insulin. In certain severe diabetics the slow-acting drug is not sufficient to maintain adequate control according to many writers, and it may be necessary to give accompanying injections of rapidly acting insulin. These two cannot be mixed and given in the syringe. They must be given in separate syringes and in separate sites in order to obtain the desired effect of each. According to E. M.

Watson,⁴ when they are mixed together, regular insulin is converted into protamine zinc insulin, and only the delayed action of the latter is obtained.

Complete freedom from glycosuria may be difficult to accomplish with either single-dose protamine zinc insulin or combined doses of protamine zinc and plain insulin given once a day. Mosenthal,⁵ Tolstoi⁶ and others have shown that improvement in glucose tolerance is possible even in the presence of glycosuria and hyperglycemia when the patient is under continuous protamine zinc insulin treatment. Patients with fairly heavy glycosuria may be kept free of ketosis, nitrogen balance may be maintained, and the patients may gain weight and improve symptomatically and eventually require smaller doses of insulin, in the experience of these men. Other authorities feel that this is a dangerous approach and that attempt should be made to control all patients to the point of freedom from glycosuria and approximately normal blood sugar throughout twenty-four hours.

When large doses of protamine zinc insulin are required, hypoglycemic reactions occur not infrequently. When these reactions occur in late evening or early morning they usually may be controlled by adjustment of diet so that a bed time lunch is given.

Another disadvantage of protamine zinc insulin is the not infrequent local (allergic) cutaneous reactions. These may be so severe as to require change to another type of insulin.

There have been three other "delayed-action" insulins developed in recent years. A comparative study of their activity is found in a recent article by Bailey and Marble.⁷ One is *Histone zinc insulin*—a turbid solution made by the addition of protein derived from thymus gland, and of zinc, to insulin in the same concentration as in protamine zinc insulin, that is, 0.2 mgm. per 100 units. This has a curve of hypoglycemic activity very much like protamine zinc insulin. It is slightly more promptly active, causing some fall in blood sugar levels between one half and two hours.

Globin-insulin has beef blood protein and zinc in proportion of .31 mgm. per 100 units added to prolong its action. Hypoglycemic effects begin more promptly than with protamine zinc insulin, the rate of fall of blood sugar is more rapid to the eighth or tenth hour and maintained to the fifteenth hour but rises more by the twenty-fourth hour than after either protamine zinc or histone zinc insulin.

Clear protamine zinc insulin produces an effect upon the blood sugar curve of diabetics very similar to that of globin-insulin, except that slight hypoglycemic effects are prolonged to twenty-four hours.

Any of these insulins may be substituted for protamine zinc insulin in patients who show local allergic reactions to the latter. The authors warn against further complication of diabetes management by frequent change of insulin preparations.

An insulin of intermediate action between a plain or regular insulin and protamine zinc insulin is *crystalline insulin*. It contains slightly more zinc than regular insulin but only about a fifth to a tenth as much as protamine zinc insulin (.02 - 0.4 mgm. per 100 units). It is effective in lowering the blood sugar curve within two hours; it reaches maximum effectiveness in six to eight hours and may maintain slight activity for as long as fourteen hours.

The use of crystalline insulin is not associated with local allergic reactions and has the advantage of effectiveness prolonged over regular insulin. Joslin⁸ says that if he were restricted to the use of a single insulin he would choose crystalline because of its purity and its promptness of action which makes it possible to use in diabetic coma.

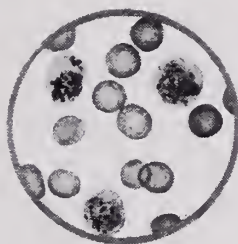
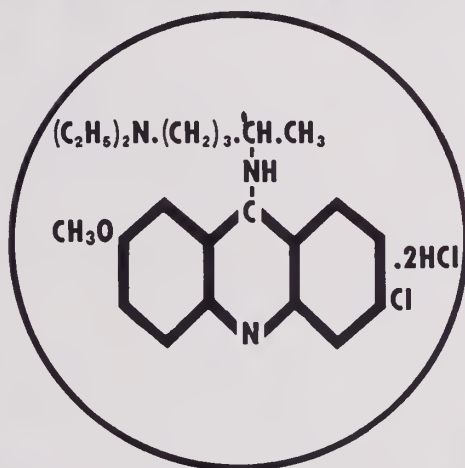
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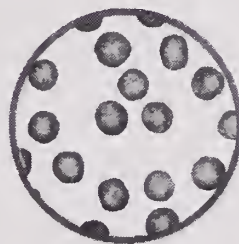
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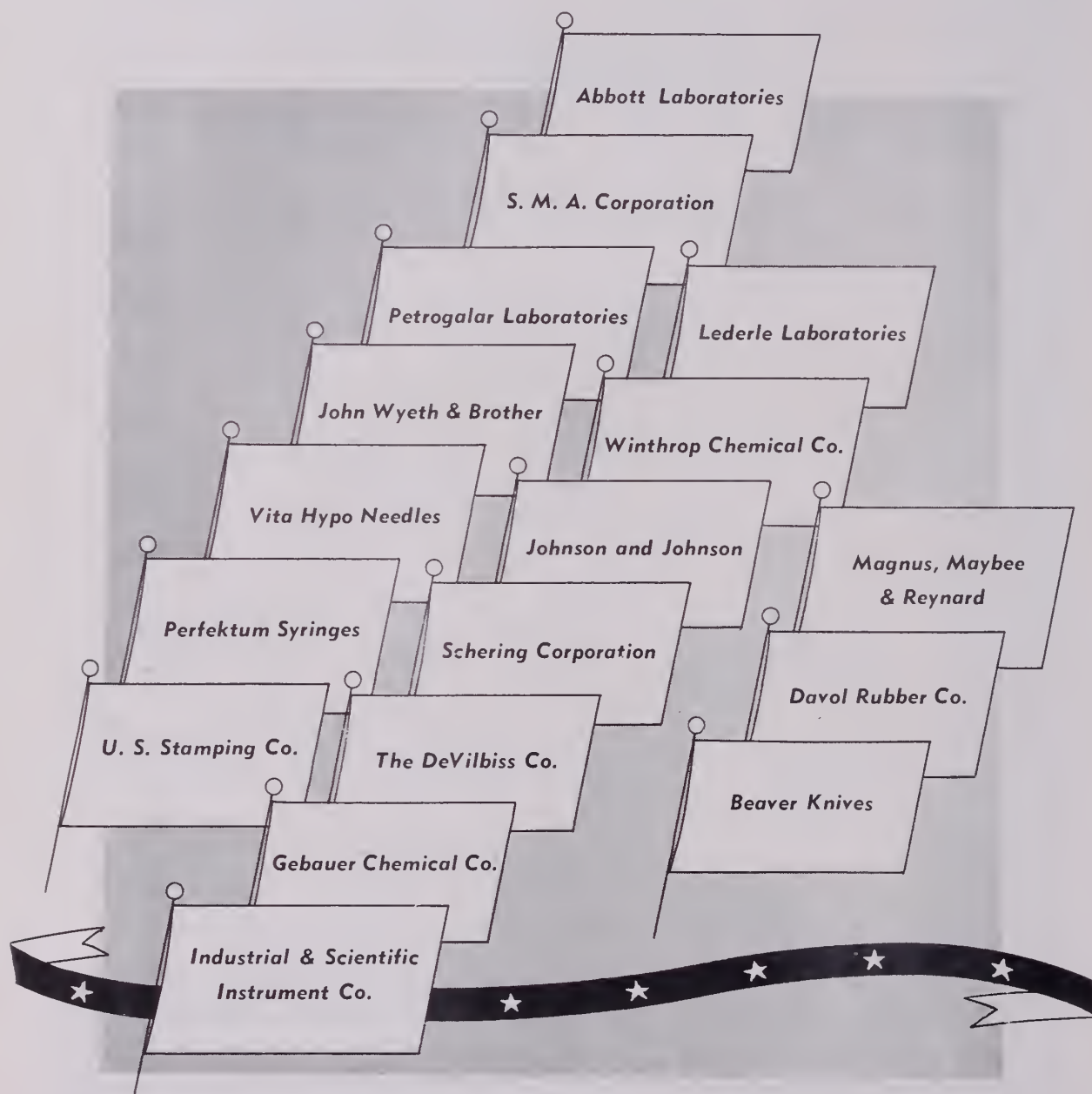
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NEUROGENIC APPENDICITIS

Even now, many appendices are appearing in the laboratory with the pre-operative diagnosis of acute or subacute appendicitis. A busy surgeon will admit that abdomens may have been opened with such preoperative diagnoses or even a diagnosis of acute exacerbation of a chronic appendicitis; yet much to his surprise, he may have found an appendix showing no gross evidence of an acute or subacute inflammation in the removed appendix. A microscopic report will even bear him out that there was no acute or subacute inflammation in the removed appendix.

Extra-Appendiceal Disease

It is well known that there is no definitely established specific pathology for the so-called "chronic appendicitis," since clinical chronic appendicitis has been found at operation and after microscopic study to be due to a variety of different conditions. Frequently, discomfort and pain in the lower right quadrant are due to lesions not in the appendix itself, such as a long mobile and dilated cecum, Lane's ileal kink, or Jackson's pericolic membrane. Frequent extra-appendiceal causes of the acute symptomatology are nonspecific and tuberculous mesenteric lymphadenitis, strangulated epiploic appendage, and diaphragmatic pleurisy. As Alvarez puts it, almost every symptom and sign will point sometimes to the presence of acute appendicitis and yet when the abdomen is opened, the surgeon is embarrassed to find no sign of disease; but if the surgeon would always look carefully in the mesentery of the lower part of the ileum, he not infrequently would find there a remarkable enlargement of the lymph nodes. Meckel's diverticulum, too, should always be looked for whenever the acute inflammatory reaction does not appear to reside in the appendix itself.

Non-Suppurative Appendicitis

It is also well known that symptoms simulating acute inflammatory appendicitis may be caused by non-suppurative and non-bacterial conditions—in-

festation by the oxyuris vermicularis, endometriosis of the appendix, and tumors of the appendix itself. Indeed, Short advises the operator who has qualms as to his diagnosis to examine carefully the interior of the appendix for these thread worms.

Painful Axial Neuromas

It is not generally realized that symptoms of severe or mild pain may arise from the presence of axial neuromas in the obliterated or non-obliterated appendix. Physical examination may even reveal a rigid abdomen, especially in the right lower quadrant, plus marked tenderness. In some cases, rebound tenderness was present and the psoas test was positive. Their agony may be so extreme that these patients literally double up or roll about, trying to obtain relief; or their complaint may be simply a dull ache or discomfort in the right lower quadrant with only a slight tenderness at McBurney's or Lanz's point. Nausea, with or without vomiting, range from mild to severe. In spite of the apparent acuteness of the symptoms and signs, the temperature tends to be normal and the total white and differential counts are likely to remain at normal levels.

These statements are based on a study of 344 consecutive vermiform appendices, removed at operations, showing no gross or microscopic evidences of acute or chronic inflammation. Forty-eight per cent of all such uninflamed appendices had a partially or completely obliterated lumen. There were in this series 195 cases, or 56.7 per cent, of axial neuromas, proved microscopically. In a few instances, the neuroma produced a clubbing of the tip of the appendix. Usually there was nothing characteristic grossly to indicate the presence of appendiceal neuromatosis. After proper fixation and special staining technique, 69.2 per cent of these neuromas were found to occur in obliterated appendices and the remaining 30.8 percent in non-obliterated ones. The incidence of neuromas for all obliterated (and uninflamed) appendices was 82 per cent.

K. HOSOI, M.D.

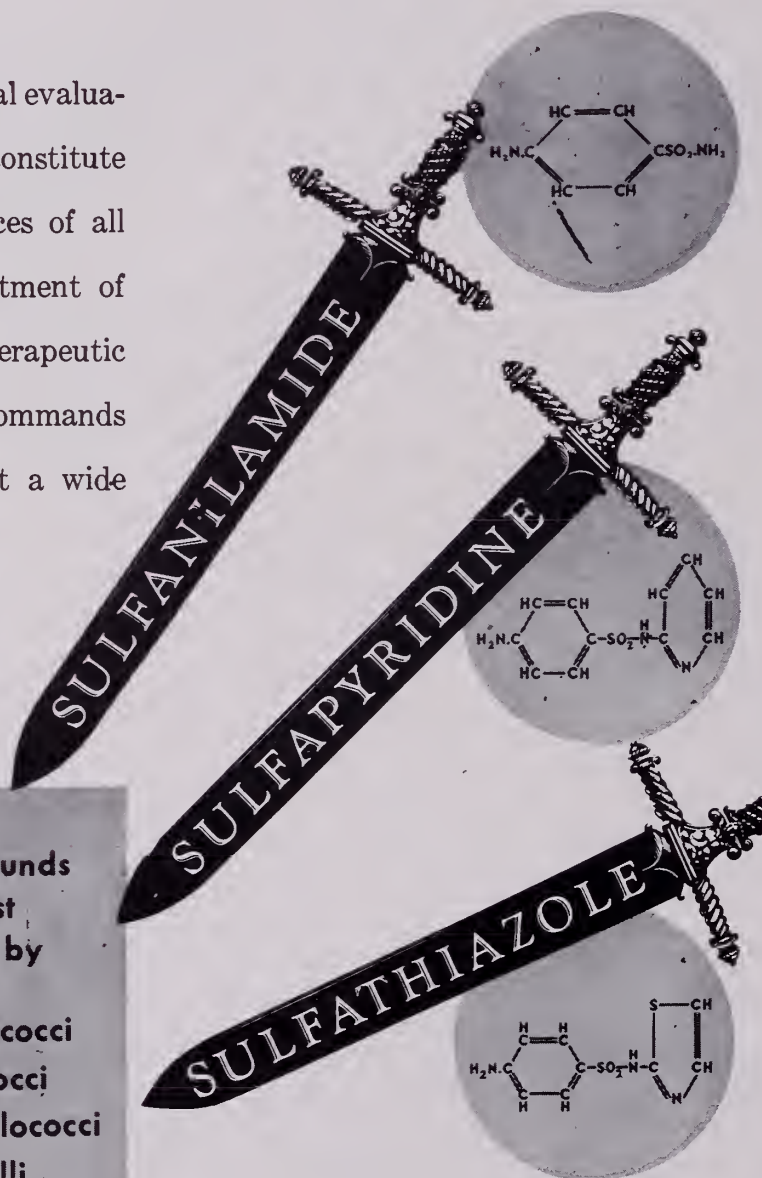
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Literature on Request

CLINICO-PATHOLOGIC COMMENT

FEE SCHEDULES

Recently we had an opportunity to examine a new proposed fee schedule for laboratory procedures at The Queen's Hospital for both "in" and "out" patients. This schedule was in reasonably close accord with the laboratory fee schedule for the Industrial Accident Board and with the fee schedule of the Hawaii Medical Service Association. It brought to light the fact that the Industrial Accident Fee Schedule is about as old as Hippocrates or Methuselah, and that the H.M.S.A. schedule was modeled on it. It is, however, surprising to see how few items should be, in justice, raised, and how few lowered. Most important of all, it brought to light that these two fee schedules are woefully incomplete. Since they were conceived, in 1927, laboratory medicine has made great progress and offers many new tests of value, and the profession at large has learned to use them and properly evaluate them. There follows a list of such tests (with brief annotation) that should be on both schedules; the fees could be agreed upon by a committee.

Hematocrit reading—(Shock—cell volume)
 Volume index—(Hemoglobin content per cell—color index)
 Clot retraction—(Clotting capacity—jaundice cases)
 Red Blood Cell fragility—(Familial icterus)
 Reticulocytes—(R.B.C. regeneration—P. A. plus liver)
 CO combining power—(Acidosis)
 Blood albumin—(Shock, burns, edema, nephrosis, eclampsia) Blood globulin
 Chlorides—(Nephritis, eclampsia, prostatic obstruction, cardiac conditions, diabetes, diarrhea, vomiting fever pneumonia)
 Sulfonamides—(Therapy, hematuria, anuria, anemia)
 Cholesterol—(Biliary obstruction, diabetes, hypothyroidism, nephritis, nephrosis, xanthomatosis)
 Specific gravity—(Changes in serum or plasma protein)
 Prothrombin time—(Bleeding tendency in icterus)
 Blood calcium—(Parathyroid pathology, tetany, nephrosis)
 Blood phosphorus—(Diabetes, nephritis, nephrosis, pregnancy)
 Alcohol—(Medico-legal)
 Vitamin C—(Scurvy, general avitaminoses)
 Takata Ara—(Liver cirrhosis)
 Levinson—(Spinal fluid for tuberculous meningitis)
 Weltman—(Exudative disease versus fibrosis or liver cell damage)

Bromsulphalein—(Liver function)
 Blood thiocyanate—(Cases under therapy)
 Heterophile Agglutination test—(Glandular fever, infectious mononucleosis)
 Huddleson Agglutination Reaction — (Undulant fever)
 Weil Felix—(Typhus, tsutsugamushi, etc.: Rickettsial diseases)
 Friedman—qualitative—(Pregnancy)
 quantitative — (Hydatidiform mole, chorionepitheloma)
 Spinal Fluid Chlorides—(General and localized meningitis, tuberculous or luetic meningitis, tumor, abscess)
 Spinal Fluid Sugar—(Diabetic coma, epidemic encephalitis, uremia. Negative in acute meningitis, tuberculous meningitis, insulin shock)
 Spinal Fluid Total Protein; albumin and globulin—(Stasis, meningitis, neurosyphilis, polio, abscess, tuberculous meningitis, cord tumor, caries of the spine, tumor)
 Pneumococcus typing by Neufeld reaction—(Serum therapy with sulfa drugs)
 Sputum for TB—(Fever of undetected origin)
 a - smear
 b - concentration
 c - culture
 d - animal inoculation
 Urine for TB, as above, catheterized specimen only
 Urine, Bence Jones protein—(Myeloma)
 Urine, calcium—(Parathyroid, renal calculi)

PATHOLOGISTS NEEDED

The clinico-pathologic situation in Honolulu and on Oahu is a most unhappy one. As the years have rolled by, the medical profession at large has been taught to avail itself of the ever increasing number of laboratory tests that make the practice of medicine and surgery easier and more exact. There was a time when Miss Mabel Slattery, of Queen's Hospital, was the only qualified laboratory technician in town. Since then, more and more technicians have been added to the local roster, until it is now quite large, but still insufficient to turn out the ever increasing amount of work required. While most of these technicians are very highly qualified, they nevertheless require the direction and supervision of a graduate in medicine, preferably one specially trained in laboratory medicine; most to be preferred would be a member of the American Society of Clinical Pathologists, or a diplomate of the American Board of Pathology. He alone should offer interpretations of laboratory findings.

At present those pathologists laboring in the local field are sadly overworked. Dr. Hosoi has charge of the Kuakini Hospital (formerly the Japanese Hospital) and is well trained and qualified for the position, but his major flair is for surgery. Dr. N. P. Larsen transferred his affections from pathology to internal medicine, even before his recent illness and trip to the coast; it is not to be expected that he will play an active part in pathology now he is back.

Dr. Hirsch has been appointed the pathologist to Queen's Hospital. Recently he has been very much overworked, what with a shortage of technologists and the augmented work that our recently greatly increased population has produced. Dr. Majoska, the new resident in pathology at Queen's, is fully occupied with his work and his study and is not yet qualified to shoulder much of the burden of the community at large.

That leaves only Dr. Tilden and myself to cover a rather large field. Between us we have recently carried the responsibilities of the laboratories of Leahi Home, Kapiolani Maternity Home, Children's Hospital, St. Francis Hospital, and the Territorial Hospital. All this, in addition to our own laboratory, at The Clinic, which is not inactive at the present time. Since Dr. Archie Eklund's entry into the Navy, we have tried to help the Kauai County Medical Society's Pathological Laboratory by reading their sections, and we have served in a like capacity for some of the hospitals on Maui. As I get nearer the end of my usefulness, even greater volumes of work will fall on the shoulders of Dr. Tilden.

This is not a very healthy situation; it is easier to visualize the etiology, however, than the therapy.

For twenty years or more Queen's Hospital has been doing "outside" laboratory work for the local physicians for very small or reasonable fees. This was a great boon for the profession, but a somewhat blind policy, for it has finally worked a hardship on the community at large. As I understand it, the fees for such "outside" services went into the general coffers of Queen's Hospital, which is a corporation—albeit not for profit—and, since these moneys did not accrue to the pathologist, to whom, at least in part, they belonged, it put the corporation in the position of practicing laboratory medicine. That is a situation which is frowned upon by the American Society of Clinical Pathologists. But because these "outside" services were so generously given, for rather nominal fees, it has deterred any young doctor, specially trained in laboratory medicine, from entering the private practice of his specialty here in our community. So now we suffer the consequences of

a shortage of pathologists, and the overburdening of those we do have.

Kauai County Medical Society long ago solved its problem by subsidizing a full-time pathologist and in that way getting an abundance of exceptionally good service.

The Honolulu County Medical Society has cooperated so well on the Workmen's Compensation Fee Schedules and the H.M.S.A. schedule, that it might, even now, get together—and hold together—on an independent subsidized clinico-pathological laboratory. Competition always improves services and two heads are better than one.

BLOOD BANK

Pardon me for bringing up so often the subject of Blood Banks, but there appeared as the lead article—and rightfully so—in the July 1942 Archives of Internal Medicine some observations by N. C. Klen-shoj and co-workers, of Buffalo, that may be very important to us here in Hawaii.

On the Seventh there was a very limited amount of plasma on hand here, though what we had served its purpose exceedingly well. The main and subsidiary banks swung into action immediately and were of inestimable value, in the succeeding days, to the cases of burns and secondary shock.

But, on the Seventh, many of the shock cases were complicated by hemorrhage, and there was no whole blood instantly available.

The ideal whole blood bank would be a large one of Type O blood only—the universal donor—if it were not for the fact that O plasma contains more or less agglutinins for A and B cells. These give rise to unpleasant reactions, or worse; in 1935 a collection of 46 cases of hemolytic reaction were reviewed, of which 20 terminated fatally. These were, no doubt, due to the use of the blood of an O universal donor with an exceptionally high titre of either A or B (or both) agglutinins.

In a pure type O whole blood bank, working in a leisurely fashion, it would be possible to titrate these individual dangerous concentrations of A and B agglutinins, and discard that donor or the blood. The New York Sanitary Code now requires such a procedure.

If most or all the anti-A and B agglutinins could be removed from (or neutralized in) the plasma of any O donor, he would be a universal donor indeed, and in such times of need as the Seventh, his blood could be used indiscriminately

and immediately without typing or cross-matching, just as pooled plasma is used.

Such neutralizing agents have now been not only found, but prepared commercially in fit form for human use. They are derived from the most bizarre sources—horse saliva, commercial peptones and gastric juice.

The authors above referred to have used such doctored O blood in 176 transfusions in 147 patients, with no more reactions than would occur in similar patients receiving homologous type blood.

They bled the O donor in the usual fashion. The blood was used immediately or stored. Just before use, 25 mgm. of A substance and 10 mgm. of B substance, in saline, was injected into the container, and mixed. If no precipitation occurred, the blood was used as in an ordinary indirect transfusion. (A 100 mesh filter in the line would be advisable.

E.A.F.) If precipitation *did* occur, the blood was discarded or used to make pooled plasma.

It sounds too good to be true. This certainly would make the maintenance of a whole blood bank most economical, and even more so if this method were combined with that of De Gowin (De Gowin et al, J. A. M. A. 114:850) who adds 500 cc. of blood to 650 cc. of 5.4 per cent anhydrous dextrose solution plus 100 cc. of 3.2 per cent dihydric sodium citrate ($\text{Na}_3\text{C}_6\text{H}_5\text{O}_7$ plus $5\frac{1}{2}$ H_2O) chilled to 4 C.

By this latter method, blood may be maintained at 4 degrees centigrade without hemolysis for thirty days and the admixture of the glucose solution makes the product more readily pass a 100 or even a 200 mesh filter. If the whole blood is not used before the twenty-fifth to thirtieth day, it may be converted into "doctored"—and safe—diluted plasma, ready for use as is.

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EMERGENCY MEDICAL SERVICES

(FORMERLY MEDICAL PREPAREDNESS)

ISLAND OF OAHU

One thousand and thirty-six tons of supplies, including 720 doses of dried blood plasma, have been shipped to outside islands. Each island's medical director makes such disposition of these as he considers best. The many serious shortages—X-ray machines, sterilizers, rubber goods and surgical instruments, for example—will have to be met by improvisations and substitution where possible. The Army has released to O.C.D. this month a large supply of instruments, less than the amount needed, but probably enough to meet the most urgent needs. Supplies are still arriving and being promptly distributed.

Serious inconvenience has been inflicted upon doctors and hospitals on all the islands by the evacuation of institutions to new sites and the expansion of almost all of them. Long trips in the black-out, and carrying on at two locations instead of one, puts a heavy load upon the profession.

On July 27, Major Edwin K. Chung-Hoon, M.C., U.S.A., was detailed to this office as Assistant to the Territorial Medical Director. His services are of tremendous value and were greatly needed.

Hospital Personnel

The extremely serious shortage of all types of hospital personnel has had the consideration of leaders of all groups concerned. Nearly fifty nurses have arrived since the last report, and the losses by evacuation have been greatly reduced. Non-professional help is now the most serious shortage. It is highly probable that the professional nursing to which we are accustomed in hospitals is a thing of the past for the duration, and the sooner we become adjusted to the situation and train non-professional persons for duties which do not positively demand the attention of a trained nurse, the sooner we shall reach equilibrium in hospital operation.

No civilian hospital in Honolulu is adequately staffed to care for the number of casualties that might result from an attack. Volunteers have been recruited who are to supplement the paid staffs at such times, but unless these have some training in advance they will not be of great use. So far most of them have not reported on request to take part

in trial runs and maneuvers; whether or not they would do so in an attack is problematical. The Department Surgeon has been asked to undertake the recruitment of non-professional labor for local hospitals and has agreed to institute measures to this end.

Plans and Training

Two maneuvers were held during the month: one in conjunction with that of the South Sector of the Army, in which only the aid stations participated, and one involving Sacred Hearts Hospital, Leahi Home and sixteen aid stations and twenty ambulances. No serious inadequacies were demonstrated except a shortage of volunteer assistants at Sacred Hearts Hospital. These trial runs will be continued from time to time, since they not only reveal mistakes but materially improve morale.

The Territorial Medical Director has visited all of the islands, some of them several times since the last report. On each island, County Medical Society meetings were held and medical war preparations were discussed at length. In most instances every doctor on the island attended, although the meetings were usually at noon on a week day. This indicates a very healthy state of mind in the profession, when one considers the length of the journeys entailed. The policy has been laid down and approved by the Territorial Director of Civilian Defense that each island medical director will be autonomous in his operations, and that the Territorial Medical Director will not make decisions regarding details of administration except upon request. In the last analysis each of these men is responsible for the propriety and adequacy of his preparations and responsibility should carry control with it.

Supplies: Fans and Generators

A supply of ventilating fans for hospitals has arrived and is being distributed throughout the Territory. Honolulu hospitals are being supplied with a reserve of materials which would be urgently needed in an attack. A few stand-by electric generating sets arrived and are being installed as rapidly as possible. These are Diesel or gasoline operated units, varying from 5 to 75 kilowatts in capacity, according to the size of the hospital concerned. In no instance are they capable of carrying the entire

hospital electric load: only the absolutely essential electrically operated facilities are connected to them, such as blower motors on stoves and boilers, refrigeration plants, surgery lights, and so on. X-ray apparatus may be operated by them provided no attempt is made to use high milliamperage for instantaneous exposures. A larger supply of these sets is on order and expected at any time.

Red Cross Nurses

The Red Cross Nurses sent here to staff Sacred Hearts and Wahiawa Hospitals were transferred to the payroll of the O.C.D. on October 1. It is impossible to overstate the value of the work that this group has accomplished. Their spirit and ability have been outstanding and this community is deeply indebted to them and to the American Red Cross for what they have done. Additional nurses are now being recruited by the Red Cross for O.C.D. hospitals and expansion of similar facilities on the outside islands.

Hospital Evacuation and Expansion

Plans for the evacuation of rural hospitals and for the medical care of evacuees from rural coastal areas were perfected and cleared with the military, naval and civilian authorities concerned. Minimal surgical and obstetrical facilities are being provided at Kunia School, Kipapa School and at Waimano Home. Additional equipment and supplies for the expansion of Wahiawa Hospital are being stored near the hospital, and evacuation buildings are earmarked for use as hospital wards should the need arise.

The hospital expansion and construction program on the outside islands is moving along rapidly. Huleia on Kauai is completed and should shortly be equipped. Olaa is under construction, Waikapu is completed, Malulani, Puunene and Pioneer have all completed evacuation. Puukolea, the Cooke family home on Molokai, is being converted into a 50 bed emergency stand-by hospital. Lanai City School is being prepared for rapid conversion to a hospital. On Oahu, Sacred Hearts and Wahiawa Hospitals are running with a fair patient load and Shriners' Annex and Manoa are ready for occupancy at a moment's notice.

First Aid Stations

The aid stations on Oahu, 4 rural (Waianae, Wahiawa, Kaneohe and Kailua) and 16 urban (Kalihi-kai, Farrington, Palama, Kawanakoa, Manoa, Scottish Rite, Lunalilo, Kaahumanu, Pohukaina, Kuhio, Aliiolani, Liholiho, Waialae, Thomas Jefferson, Wai-kiki, and Maunaloa), are carrying on with the first aid training of station volunteers and others, and

the advanced training of their own staff members, as well as preparing dressings for local hospitals. The number of persons who receive first aid in emergencies and are then referred to private doctors or some agency is considerable; it includes children in adjacent schools, service men, civilians in the neighborhood, and so on. The stations are equipped and staffed to serve as temporary evacuation hospitals in the event that circumstances might require certain types of casualties to be held in the stations. The aggregate number of patients who might be taken care of in this way for 24 to 48 hours is approximately 500.

Considerable criticism continues to be levelled at these organizations because their personnel is being paid. A quotation from E. R. Murrow, London correspondent for N.B.C., seems germane: "We might perhaps learn something from British Civilian Defense. In the beginning there was great enthusiasm. People came rushing in to volunteer as air-raid wardens, as auxiliary firemen, and then nothing happened. No bombers came in and in a few months voices began to be raised saying, 'We're wasting a lot of money. All these firemen sitting about doing nothing, stretcher bearers, et cetera. We ought to reduce the whole Civilian Defense organization to a skeleton force. And in a few cases that was done, with results that must be seen to be appreciated.'"

Military authorities say that Honolulu could easily receive an attack that would produce 2,000 casualties in 5 minutes.

A typical station at full strength has eight night and eight day paid workers, including the doctor. Vacancies due to inability to secure qualified personnel at the salaries offered have, however, reduced this by more than 25 per cent.

The O.C.D. spends approximately \$100,000 a month for *additional* fire protection for the city of Honolulu. The aid stations cost \$43,000 last month, less than one-half as much to save lives as to save buildings. No one can know whether the need for either of these services will ever arise, or whether the preparations are adequate, inadequate or excessive, since the entire problem is based upon supposition. Certainly preparation to save lives is important. The Department Surgeon of the Army and the Preparedness Committee of the Medical Society consider that the medical program is, if anything, below the potential need in scope. The responsibility for reducing it must be borne by someone of higher authority than this writer.

Early in September, several questions of policy regarding the operation of aid stations on Oahu were

submitted by questionnaire to the Preparedness Committee of the Medical Society for decision. They are perhaps of sufficient general interest to warrant a brief statement of them.

1. *Oxygen therapy.* Because of the great shortage of equipment for supplying oxygen to patients, it was decided that these facilities could not be extended to aid stations until the hospitals were adequately equipped.

2. *Administration of plasma* in aid stations. Saline and glucose solutions and the apparatus for their administration, as well as transfusion sets, are already in the stations. A list of available type O donors residing in the vicinity of the stations has been supplied by the Blood Bank. Dried and liquid plasma storage sites are distributed throughout the city and these locations are listed in the aid stations. The committee felt that plasma should not be stored in the stations.

3. *Intravenous anesthesia.* Since relatively few aid station directors are familiar with the use of intravenous anesthesia, it was recommended that this be applied only to directors familiar with its use.

Tetanus antitoxin is on hand in stations as well as a small supply of tetanus toxoid. The committee decided that these substances should be administered only to ambulatory patients and should not be given to patients sent to hospitals.

The committee was unanimous in deciding that the serious shortage of surgical instruments in the territory made it out of the question to supply facilities for major surgery in aid stations.

4. The Chemical Warfare Service has been asked to supply one diaphragm gas mask to each station.

5. *Field hospitals.* The establishment of field hospitals available for use in the event other hospital facilities were lacking or inadequate was not considered feasible because of the impossibility of equipping them.

6. *Classification of patients.* The committee decided that the present method of classifying and identifying patients by means of tags should be continued and that aid station personnel should leave patients' foreheads clean for marks to be put on by the triage officers at the hospitals.

The Department Surgeon is at present engaged in an inspection of all O.C.D. medical facilities on this island with a view to discovering any inadequacies or defects which can be remedied.

The attention of surgeons throughout the territory is invited to the possible serious difficulty which might arise in connection with hospital evacuation if patients with major fractures are being treated by simple traction without splints. It is recommended that, wherever possible, fractures be immobilized in an apparatus so attached to the patient that he can be lifted from the bed to a litter and carried out of the hospital if this becomes necessary. Where simple traction must be employed a Thomas splint or other device ready for instant use should be kept beside the patient's bed to provide for the necessity of prompt evacuation.

Rural Emergency Ambulance Service

The problem of providing ambulance service for emergency illnesses, including obstetrical cases in the country districts, particularly on windward Oahu, has been a very difficult one. In general, during the day time there is little difficulty in caring for these cases by City and County or O.C.D. ambulances. The principal difficulty arises during hours of blackout. The dangers inherent in making an ambulance trip over the Pali and back during blackout hours are definitely grave and O.C.D. ambulances have been directed not to attempt it. In the case of an obstetrical patient the danger of delivery occurring in the ambulance in transit with no one available to care for the situation adds gravity to the procedure. The Army General Hospital at Kaneohe (Territorial Hospital) has agreed to care for any genuine emergency case brought to it.

Physicians who have obstetrical patients in rural districts are urged to explain the situation to their patients that O.C.D. ambulances will not transport them to Honolulu during blackout hours and that they should make their own arrangements or to come to Honolulu in advance of the onset of labor. However, O.C.D. will transport them to the Territorial Hospital.

The principle must not be lost sight of that the O.C.D. Emergency Medical Services are primarily for the care of war casualties and other situations arising from the war effort and are not intended to supplant the normal civilian medical, hospital, and ambulance set-up. Their use for these purposes is justifiable only when there is a genuine emergency. Routine services should be furnished by the usual agencies.

H. L. ARNOLD, M.D.
Territorial Medical Director, O.C.D.

PHYSICIAN ASSIGNMENTS BY HOSPITALS DURING EMERGENCY (OAHU)

CHILDREN'S HOSPITAL

Assigned

Alsup, F. (chief)	Hayes
Alsup, W. E.	Hollmann
Halpern	Howarth
Ing, H. Y.	Smith
Lee, R. H.	Yee, S.
Marshall	

CITY & COUNTY EMERGENCY HOSPITAL

Staff

Chun, R.	Kometani
Cooper, H. B.	Tyau
Katsuki, D.	Yap, R.
Mossman	

Assigned

Akina	Culpepper
Benyas	Duryea
Cooper	

KAPIOLANI HOSPITAL

Assigned

Milnor (chief)	Putman
Phillips	Schattenburg

KUAKINI HOSPITAL

Staff

Matsuyoshi	Takenaka
Akita	

Assigned

Bowles (chief)	Nishijima
Batten	Ogawa
Hasegawa	Okazaki
Kuninobu	Sakimoto
Schnack	Uchida
Shinkawa	Uchiyama
Straub	Uyeno
Takaki	Yamane

Blood Bank

Ohta

LEAHI HOSPITAL

Staff

Nojima	Radner
Perlstein	Walker

Assigned

Black	Hodgins
Brown, R. O.	Osorio

QUEEN'S HOSPITAL

Staff

Bailey	Ito
Buzaid	Sexton
Hirsch	Sugihara

Assigned

Judd (chief)	Hill
Bell	Hosoi
Chang, W. K.	Inouye
Childs, L. S.	Lam, F.
Doolittle	Molyneux
Gotshalk	Sia
Hamre	Spencer

Blood Bank

Devereux	Pinkerton
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SACRED HEARTS HOSPITAL

Staff

Irwin, F.	Waite
-----------	-------

Assigned

Strode (chief)	Irwin, P. S.
Alana	Kawano
Allison	Lee, R. C.
Arnold, Jr.	Linson
Beck	Morgan
Bowles	Pang, L. Q.
Brown	Smith
Buck	Tilden
Burgess	Van Poole
Cushnie	Yamamoto
Ellinger	Zink
Fennel	

SHRINERS' HOSPITAL

Assigned

Craig (chief)	Sato
Stewart	Wynn
(acting chief)	Yamashiro, M.
Farrell	Yamauchi
Gordon	

ST. FRANCIS HOSPITAL

Staff

Chasen	Childs, E.
--------	------------

Assigned

Gaspar, (chief)	Li, M. H.
Austin	Moffat
Benz	Ohtani
Chock	Reichert
Ing, E.	Schnack
Kawano	Seto
Kim	Pang, H. Q.
Li, B.	

ST. LOUIS HOSPITAL

Assigned

Holmes	Mitchell
--------	----------

TERRITORIAL HOSPITAL

Staff

Stephens, E.	Ozawa
Kepner	Taylor
Natsui	

RURAL HOSPITALS:

Staff

WAIPAHAU

Casey

WAIALUA

Davis	de Harne
-------	----------

EWA

Eveleth	Fujii
---------	-------

AIEA

Liljestrand	Warshauer
Thompson	

WAHIAWA

Mack

KAHUKU

Rothwell

MOBILE SURGICAL TEAM ON CALL:

Assigned

Cloward, R. B.	Chung, M. F.
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ISLAND OF MAUI

Blood Typing 30,000 Civilians

There is little doubt that if everyone's blood type were known much time would be saved during an emergency in obtaining blood and giving transfusions. A laboratory can cross-match the blood of twice as many donors and recipients if both have been previously typed.

With this in mind the medical division of the Maui O.C.D. entered upon a drive to get as many civilians typed as possible. The Army district surgeon encouraged the program and offered assistance. All hospitals on Maui agreed to type, free of charge, any person who would come to the hospital laboratory. The problem then was to work out a system for mass typing to be executed as inexpensively as possible and with a minimum chance of error. The O.C.D. had \$300.00 in its budget for blood typing and promised further funds later if needed.

The most accurate method of blood typing is by means of commercial anti-serum, but enough serum to type 30,000 people would have cost over \$2,000. This sum was not available. All hospital laboratories were normally using human serum, so it was decided to use human serum from known A and B types. Each hospital was furnished with a one hundred test size tube of anti-A and anti-B serum to check the blood serum to be used in typing. Only high-titer serum was to be used. Each test was allowed to stand for twenty minutes and then read microscopically. By using this method and by allowing only technicians to perform and read the tests, it was thought that the chance of error was practically eliminated. Type B serum was colored with brilliant green so that it could always be identified. The international nomenclature was used in all hospitals.

An accurate record was kept of each person typed, including name, serial number, address, age, and blood type. The O.C.D. had special 3 x 5 cards printed for this purpose. A card was made out for each person typed and filed in the hospital laboratory. If a person was typed in a district other than where he lived, a duplicate card was made out and sent to the hospital in his home district. A special stamp reading "O.C.D. blood type—" was issued to each laboratory and as each person was typed his blood type was stamped on his personal identification card. Thus every person would always have a record of his blood type with him.

The actual typing was done by the hospital laboratory technicians. This was done in addition to

their normal work. The Army loaned one laborator technician for 15 afternoons to one hospital and helped organize a system there for typing. The Army also typed about 1600 people, using its own facilities except for the serum. In return the Army received a large negative-Wassermann blood-donor list.

The actual system for mass typing was left up to the individual laboratory. After a week of experimenting, I worked out a system at the Puunene Hospital by which 120 people could be typed in an hour by one team. Our record was 800 typings in seven hours, though we believe 600 tests are as many as any one team should attempt in one day.

Our team consisted of 12 people as follows:

Two boy scouts kept the people in line and orderly.

Two clerks at a table outside the laboratory. The first clerk took the identification card and put the serial number on an order number card. The second clerk copied down the name, serial number, address, age, and order number on a tablet. The person was given the order number card and sent to the laboratory.

One worker collected the blood—3 drops from the finger—into a tube of citrate. The order number was written on the tube and the card taken up at this point.

One helper put A & B serum on a slide.

One technician mixed the blood with the A & B serum. An individual slide divided in half by a wax pencil mark and marked with the order number was used for each test. Ten tests were mixed on one pad and set aside for 20 minutes.

One technician read the tests.

One clerk wrote the blood type on the order number card and on a tablet.

One clerk stamped the blood type on the identification card.

Two helpers washed glassware, filled tubes and labelled tubes and slides.

After the blood had been taken the people were sent outside the laboratory to wait. Once the person was given an order number he had to remain in line as the order numbers were consecutive. In this way the chance of error was lessened.

By means of this system we typed over 8,000 people in three weeks. School teachers and other women volunteered as clerks.

At the present time there are 41,000 civilians on Maui and over 30,000 have their blood type recorded on their identification cards. It is also on record at the nearest hospital. All the hospital laboratories are continuing to type anyone who requests it.

Knowing the blood type makes it much easier to get and give blood, but of course only serologically negative blood may be given. Every Maui hospital has organized a transfusion service consisting of special equipment, trained personnel and a negative-Wassermann donor list. Every hospital has enough sterile equipment on hand to take blood for and give 25 transfusions. This apparatus consists of empty Vacoliter bottles with two-hole rubber stoppers. Through one hole a glass tube is inserted halfway to the bottom. Into the other hole is placed a tube containing cotton to serve as an air vent while taking the blood. Rubber tubing and the blood-taking needle are attached to the long tube. One hundred cc. of 3 per cent citrate is placed in the bottle; it is wrapped in a towel and autoclaved. It is stored like this and can be used on a minute's notice. When blood is given, the rubber tubing is detached so that the long glass tube now serves as an air vent and a filter-drip. Tubing is inserted into the hole which originally contained the air vent. The bottle is inverted and the blood is ready to give.

Each hospital has trained at least three teams of two persons each to take blood so that the doctors will be free to work elsewhere. Each hospital is building up a large donor list and has been doing so for the past year. Over 3,000 negative-Wassermann donors are available now. If hostilities begin, each hospital will collect 25 pints of blood immediately, before casualties arrive, and hold this for use as needed.

WILLIAM B. PATTERSON, M.D.

ISLAND OF KAUAI

The month of October has seen great progress made in the program for O.C.D. hospitals on Kauai. With the completion of the Huleia 150-bed hospital and the arrival of eight trained nurses for its staff, preparations for the opening are now under way. It is expected that the hospital will be ready to operate some time in November.

Negotiations are under way to turn the Makaweli Hospital, a 50-bed hospital, over to the Army, with the understanding that it may be used by civilians in the event of an emergency. The O.C.D. is to build a 50-bed hospital at Kalaheo and upon its completion the present Eleele Hospital will move in its entirety to the new site. A 20-bed expansion ward has been finished at the Kilauea Hospital, while the Waimea O.C.D. Hospital is nearing completion.

With the progress being made in the hospital building program for Emergency Medical Services,

civilians and the medical profession can look with pride to the work of the O.C.D. on Kauai.

Eight complete emergency medical units and eight first aid ambulance units are set up on the island of Kauai. The complete units are located in the larger districts, while the ambulance units are situated in the smaller towns. Because of certain geographical features, units were organized along mobile lines. Each unit has held practice alerts in order to sustain interest and to be prepared at all times. These practices have proven very valuable because they reveal weaknesses which must be ironed out so that Kauai will have a well coordinated emergency medical program, a program to meet any emergency.

ISLAND OF HAWAII

The efficiency of the training program of the Casualty Stations on the Island of Hawaii was demonstrated in the full-scale air raid practice held for Hilo and vicinity August 28 with all units, including litter bearers, first-aid attendants, ambulance drivers, nurses, and doctors participating. All personnel responded quickly to the sound of the siren and all reported to their stations almost immediately. The casualties were handled efficiently and were transported to the main casualty station at the Hilo Standard School from which the casualties were routed to Hilo Memorial and other hospitals. There has been nothing but praise from all sources, including the medical profession, for the manner in which the casualty stations functioned during the practice drill. Similar trial runs were conducted in the Kona and Honokaa districts during September and October. In both areas the trial runs were extremely satisfactory.

The Hawaii Island Blood and Plasma Bank, operating under the O.C.D., has two branches in Hilo, one at Hilo Memorial Hospital and the other at Puumaile Home. A tentative goal of four thousand units of plasma has been set. The response to request for blood donors has been a slow but steadily increasing one. The plantations have cooperated splendidly, sending their workers in as donors.

To care for the evacuation of civilian casualties to the outlying districts, a new O.C.D. hospital is being set up at Olaa. The hospital is located on a beautiful site about one mile beyond the present Olaa Hospital. Actual construction is rapidly proceeding and it will be ready for occupancy about the first of December. The O.C.D. is furnishing a good deal of the necessary equipment for the hospital.

ARCHIE ORENSTEIN, M.D., Director



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* Laryngoscope, Feb. 1935, Vol. XLV, No. 2, 149-154
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COUNTY SOCIETY REPORTS

MAUI COUNTY MEDICAL SOCIETY

A regular society meeting was held on August 2 at the Wailuku Hotel and was attended by Drs. McArthur, St. Sure, Jr., Von Asch, Seiler, Kanda, Patterson, Dunn, Osmers, and H. Izumi. Four guests were present: Drs. Balfour, Sanders, Chou, and Major Wilbar. It was decided that the society dues be increased five dollars per annum to cover the increased per capita assessment by the Territorial Association. This motion requiring an amendment to the by-laws, final action was postponed until the following meeting.

Each member has agreed to submit a list of medical books and journals in his library so that these may be made available to medical men in service on Maui as a reference library. Dr. Kanda is in charge of this project.

The president was authorized to forward a letter of appreciation to Mrs. Ray Allen, until recently medical director of the Maui O.C.D., and one to Major Cranston for their splendid cooperation and assistance during their tenure of office.

On August 5 a banquet was held at the Maui Grand Hotel for the medical men of the Maui Service Command. Guest of honor was our departing district surgeon, Major Clyde Cranston. The Major had been with us for the past 15 months and it was with deep regret that the society bid him farewell. He has helped and advised us at every turn in the establishment of our medical defense program, and has proven a true friend to all. He is a quiet and courteous gentleman and Maui will feel his loss.

The banquet proved to be a highly successful affair ending with a poignant tenor solo by our own Ed Kushi—"Memories" (with orchestral accompaniment). He was ably (?) assisted in the final chorus by Jiggs McArthur, the other half of the Malulani vocal duo. The thanks of the society are due to Dr. John Sanders, in charge of arrangements for the event, for a successful and enjoyable evening.

A regular society meeting was held on October 4 at the Wailuku Hotel. Members present were Drs. McArthur, Osmers, Dunn, Kanda, Patterson, Shimokawa, and K. Izumi. Guests included Dr. S. D. Allison, director of venereal disease control, Territorial Board of Health, Honolulu; Dr. N. R. Sloan, Medical

Superintendent, Kalaupapa Leper Settlement; Major Wilbar, M.C., U.S.A.; Dr. Balfour, Dr. Sanders and Dr. Chou.

Dr. W. D. Balfour, Wailuku Sugar Company physician, was elected to membership in the Maui County Medical Society by transfer from the Hilo County Society.

The resolution referring to change in by-laws as concerns increase in annual dues was read and adopted by unanimous vote.

Dr. McArthur brought before the society the subject of inadequate x-ray equipment for the Malulani Hospital. He stated that the O.C.D. had offered to install at the Maunaolu Seminary Unit, an old "Snook" X-ray outfit. It was the unanimous opinion of the society that it would be inadvisable to install an old machine which was already inadequate to meet all requirements and which might give out at any moment. It was then decided to request the O.C.D. to install a new large type X-ray machine suitable for the requirements of the institution.

Major Wilbar, after a short talk on public health matters, especially those relating to school hygiene, introduced Dr. Allison and Dr. Sloan. Dr. Allison gave a very interesting talk on the subject of venereal disease control and was followed by Dr. Sloan who discussed his experiences in the field of leprosy at Kalaupapa and elsewhere.

WM. OSMERS, M.D., reporting

HAWAII COUNTY MEDICAL SOCIETY

The 206th meeting of the Society was called to order on June 26, 1942, at 1:00 p.m. following a luncheon at the Naniloa Hotel. There were 26 members present and Dr. Arnold Sr. as our guest.

Dr. Arnold, recently appointed officer in charge of civilian medical defense for the Territory, outlined his duties, viz.: (1) to advise physicians in matters of preparedness for handling civilian casualties, and (2) to procure supplies and equipment. He

suggested that a survey of our hospitals be made, classifying them according to the types of cases that can best be cared for in each. He observed that our first-aid set-up was somewhat different from that on Oahu, but had no recommendations or criticisms to make. Question of the first-aid and casualty station personnel's travelling on the roads during an air-raid was discussed. Thus far, the military guards have allowed no travel whatsoever on the roads during practice air-raids.

Dr. Brown reported that approximately 500 units of wet plasma and 264 units of dry plasma were available. Dr. Arnold suggested that we maintain a large donor list and procure more plasma if possible.

In regard to the Physicians' Procurement and Assignment Service forms, Dr. Arnold believed that this should not function in the Territory, which was also the belief of Colonel King, as we are under martial law and all physicians are responsible to the military. A ruling on this question is being sought.

Other questions were discussed, such as distribution of plasma and use of the recently trained N.Y.A. girls.

A general order on the sale of sulfa drugs and a letter from Colonel Green regarding the same were discussed. It was decided that Dr. Phillips and Dr. Arimizu draw up such an order to be presented to the military authorities for approval.

The 207th medical meeting of the Society was called to order on July 26, 1942, at 1:45 p.m. at the Hilo Memorial Hospital. Thirteen members were present and several guests from the Medical Corps of the Army.

Short papers were given by Drs. Tompkins, Crawford and M. L. Chang regarding the importance of bronchoscopy in the treatment of pulmonary tuberculosis.

A letter from the Secretary of the Territorial Association was read, advising that there will be a raise in dues from \$15.00 to \$20.00 per member. This is to cover the HAWAII MEDICAL JOURNAL and the library privileges. Beginning this year and hence forward, the library will furnish an index medicus to each island and an attempt is being made to secure the back numbers also for the outside islands. There was some discussion as to raising our annual dues but action on this was postponed. Question of prorating dues for new members was discussed and it was felt that since the Territorial Association does not prorate assessments on these new members, we should not.

A letter from Dr. Arnold was read, stating that Procurement and Assignment Service blanks should be filled out and forwarded to Washington. The military governor is pursuing this further.

Dr. Orenstein reported that two new ambulances had arrived for medical civilian defense, one of which has been made available to all physicians for use during blackout hours and may be had by calling the police department.

Dr. Tompkins' resignation as secretary was accepted. Dr. M. L. Chang was unanimously elected to finish the year in this office.

Physical examinations and immediate first-aid treatment for vocational school students was discussed. It was felt that these students should have a physical examination by their private physician at the time they start their course so that any gross physical defects may be discovered. In case of injury, first-aid treatment will be given at a minimal cost and the students referred to their own physician for further care.

The 208th regular meeting of the Society was called to order on September 6, 1942, at 2:00 p.m. at the Naniloa Hotel by President Patterson. Twelve members and nine guests from the military personnel of the Mountain View Hospital were present. Prior to the meeting, a farewell luncheon honoring Dr. A. T. Roll was enjoyed by all.

Dr. T. Yoshina gave a comprehensive paper on "The Care of the Premature Infant." He stated that the prevailing mortality rate of 40 per cent in the Territory, while it compared not unfavorably with that of some large mainland cities, could be reduced by intelligent care. The following four procedures of therapeutic management were stressed: (1) Avoidance of initial chill by maintenance of uniform optimum temperature and humidity; (2) Prevention and early adequate treatment of cyanosis and allied symptoms of respiratory distress; (3) Proper individualized feeding with proper attention to fluid balance; (4) Prevention of infections and nutritional (mineral and vitamin) deficiencies. He concluded that the prevention of prematurity was essentially an obstetric problem. Dr. Patterson demonstrated a locally-made incubator embodying several admirable features. Considerable prolonged discussion followed in which the military personnel freely participated.

Col. White, commanding officer of the Mountain View Hospital, invited the medical society to breakfast, luncheon or dinner at Mountain View

where a scientific session would be conducted by the military personnel. It was agreed to consider this as the society's semi-annual meeting, arrangements to be left in the hands of the President.

Then ensued discussion of the time of future meetings. It was voted that meetings be held hereafter at 4:00 p.m. on the Tuesday of the month closest to full moon.

The treasurer, Dr. Loo, reported that there were three members of the society who were in arrears for two or more years, that repeated attempts by mail failed to procure the required dues. He was directed to send a registered, receipt-requested letter to the delinquent members quoting the applicable section of the by-laws which provide that members more than one year in arrears shall be dropped from the roll.

Dr. Orenstein reported having received a letter from one Major Mayfield to the effect that he had incurred a bill of \$3.00 at the Hilo Tribune Herald for "Red Cross" stickers for physicians' cars at the onset of the war. It was voted that the Society pay the above bill.

Reports from various committees were called for. Dr. Phillips had nothing to report from the Venereal Disease Committee. Dr. Orenstein reported that the care of casualties as demonstrated during the recent air-raid drill was about 75 per cent successful, and that steps were being taken to correct certain errors in the set-up. He stated that Dr. C. B. Brown had been appointed in charge of the organization of a blood and plasma bank under the Emergency Medical Service of the Office of Civilian Defense.

Dr. Brown outlined the plan and scope of the blood bank. He stated that Dr. Pinkerton, chief of the Territorial Bank, had recently met with a number of interested parties to demonstrate the equipment and methods used on Oahu, to discuss the publicity campaign and its ramifications and a host of related matters. It was suggested at that meeting that a goal of 4,000 units of plasma be set, and that increased personnel be employed for the necessary work to reach that goal. Dr. Brown presented the forms proposed for the recording of data re donors. Much discussion followed though no definite conclusions were drawn. Several problems were posed and unanswered, among which were: (1) The urgent need for a larger donor list; (2) The advisability of centralizing the bleeding stations. It was generally agreed that preserved whole blood of any type as well as plasma should be available to any and all physicians at any emergency, that blood types should be imprinted on identification certificates. Dr. Orenstein

will contact the proper authorities regarding the latter.

Dr. M. L. Chang reported that the Child Welfare Service of the Department of Public Welfare had notified him that an additional case worker was to be added to establish and maintain cordial relationships between subjects with illegitimate pregnancies and their immediate families with a view of having these prospective mothers and their offspring cared for in their own homes rather than in an institution. They wished members of the society to refer cases to the department.

M. LEON CHANG, M.D., reporting

The Society is making every effort to work as a unit in the Medical Preparedness effort. In line with this policy we are planning our meetings during daylight hours whenever possible, and we are inviting the military medical officers here to participate in our meetings whenever they can and care to. Our programs are now composed of several short papers, each with a prepared discussion followed by open discussion for ten minutes. We are striving to have papers by our members discussed by visiting physicians with special training or knowledge in the subject under consideration, and in turn we have asked visiting physicians to lead our programs with the discussion being led by our members. So far this approach has been very encouraging and seems to be reviving interest in scientific papers and discussion. It should serve as a stimulus to all of us as well as enabling local physicians and visiting physicians to become thoroughly acquainted with each other, and should make the work at hand and in the future more easily accomplished by all involved. At our last two regular meetings papers were read by local physicians and very ably discussed by Army physicians present. On October 17 the members of the Society were the guests of the 148th General Hospital. The program was as follows:

Chronic Malaria - LT. RUFUS R. ROBERTS

Discussion: DR. THOMAS KEAY

Chronic Dislocation of the Shoulder. Presentation of Two cases with Operative Correction.
CAPT. FRANK A. BAUMANN

Discussion: DR. L. L. SEXTON

Infectious Mononucleosis - MAJ. MILTON D. KLEIN

Discussion: DR. S. R. BROWN

Management of Burns - Presentation of Three cases -
MAJ. WILLIAM S. CORNELL

Discussion: DR. A. ORENSTEIN

After each of the above papers was read by members of the Hospital Staff the discussion was led by a member of our Society. There was an unusual amount of interesting discussion from the floor

following each paper and all present agreed that an excellent meeting had taken place. Twenty-three members of our Society from all parts of the Island were present.

H. M. PATTERSON, M.D., reporting

HONOLULU COUNTY MEDICAL SOCIETY

A summary of activities April-October, 1942.

Meetings continue to be held regularly on Thursdays at 9 a.m., in combination with the Thursday Morning Clinics of the Queen's Hospital. Communicable disease reports are given and announcements made to the society at these times.

The Board of Governors meets on the first Friday of each month to conduct the business of the society and a summary of its actions is reported at the following Thursday morning meeting.

Membership: Frequently it has been suggested that the membership be issued cards upon payment of dues. This was brought up at the June meeting of the Board of Governors and it was decided to postpone consideration of this for the duration.

Likewise the matter of creating an associate status of membership was discussed and deferred.

The following members were recognized as exempted from dues and assessments for the duration, being in military service and not engaged in private practice:

ARCHIE CHUN-MING
W. F. MACKLIN
E. K. CHUNG-HOON
H. M. CHANDLER
FREDERICK L. GILES
JOSEPH F. C. LAU
CHARLES L. WILBAR
F. TONG
DAVID PANG

Library: The Library Committee ruled that medical officers of the services could borrow books and six months' old journals on the same terms as members.

Rat Control Program: The society voted to give its endorsement to this program of the Chamber of Commerce.

Procurement and Assignment Service: Doctors were advised to delay filing these forms until Dr. Arnold had received a ruling from the Department

Surgeon as to whether this applied to Hawaii. A subsequent announcement advised that they be filed as requested.

Parking of Automobiles: The society approached Dr. Arnold to secure permission for doctors to park during daylight hours on streets where parking is prohibited. Response was transmitted from the Military Governor's office quoting Section 3.04 of the Honolulu Traffic Code, "Allows physicians when responding to, or in actual attendance to an emergency call to park or stand within restricted areas or no park zones. Note that this applies only to emergency calls." Comment was made further: "So far as this office is concerned a doctor on a real emergency can park in the middle of the street if it is necessary to do so, but under ordinary conditions it is believed that the foregoing indorsement is correct."

Publicity: A policy offered by the Publicity Committee was adopted as follows:

The committee assumes that its duty is to prepare and secure publication of material designed to inform the public of activities of the medical profession of Honolulu with especial emphasis on dissemination of reliable data which will promote proper public health education and enhance relations between the public and the profession.

The committee does not desire to act as a Board of Censorship to impose restrictions on members of the Society who, as individuals, contribute articles to the public press or circulate such articles over the radio. Such contributions may be valuable and probably should be encouraged. If, however, individual physicians violate the proprieties of the profession by seeking undue personal publicity, by giving publicity to false, harmful or unsound statements, or by falsely representing themselves to be properly qualified or representative of the profession, your committee feels that such offenses are matters for consideration by the Board of Censors and not by this committee.

Diathermy Machine Regulations: Major de Young, medical member of the committee appointed by the Military Governor to draw up regulations, was invited to a Thursday morning meeting to clarify the matter of registration and regulations.

Hawaii Medical Service Association: Money accumulated in the physicians' reserve over the last two years was disbursed to the doctors. The medical society was reimbursed for expenses incurred by it in the reorganization of the plan.

It was agreed to postpone any consideration of change in the fee schedule until changes are made in the Industrial Fee Schedule. The agreement between the HMSA and the Medical Society was re-

newed for another year without change except that this year only 10 per cent will be deducted from bills and deposited in the physicians' reserve.

U.S. Engineer Employees: After many delays a plan was agreed upon between the medical society and the U.S. Engineers to provide a uniform fee schedule for non-industrial medical service to Hawaii Constructor employees, and notices went out to the membership with instructions as to how these cases should be handled. A few days after it was to be put into effect the Army undertook to supply such medical service, with the result that only an occasional case would be referred for treatment to private physicians. It was felt that under the circumstances physicians should charge for such cases on a private fee basis.

Tetanus Immunization: The suggestion made by Dr. Haralson, that if the medical societies recommended it, the Health Department would consider a compulsory tetanus immunization campaign, was discussed by the Board of Governors. It was their recommendation to encourage tetanus immunization by private physicians and institute a campaign as in the past for diphtheria, but that this not be made compulsory.

Annual Examination of Policemen: The society contacted the Police Commission offering the society's cooperation in working out a plan. Dr. Lam reported that a representative of Chief Gabrielson called on him promising to contact us further, which was not done. The matter has been referred to the Committee on Forms of Medical Practice.

Industrial Fee Schedule: The Workman's Compensation Committee was instructed to proceed with preliminary plans for the revision of this schedule.

Nurse Shortage: The Board of Governors felt that the medical society should take an active part in trying to help solve the nurse shortage in Honolulu hospitals. A survey was made to ascertain what the need was and what resources existed for recruitment of nurses. Several meetings were held with hospital, nurse and physician representation to discuss recruitment and adjustment possibilities, and certain recommendations coming therefrom were passed along for follow-up.

War Workers: The matter of defense workers' enlisting the aid of doctors in securing release from contract without basis for physical illness has come up repeatedly. A meeting was arranged with Mr. Andrew Schmitz, Deputy Commissioner, U. S. Employees Compensation Commission and Mr. White of Liberty Mutual Company to review the matter. The procedure to be followed in making proper re-

ports was outlined and it was suggested that a committee of employers, insurance carriers and physicians continue discussions to work out difficulties.

Medical Supplies: Capt. Nixon, in charge of civilian medical supplies at the Hawaiian Department Medical Depot, was invited to a Thursday morning clinic meeting where he gave a report of the medical supply depot set-up and what procedure doctors should follow to get their supplies. A full report is contained in the May issue of the JOURNAL under Emergency Medical Services.

Aid Stations: Report was made by the Preparedness Committee that it favored the continuation of a paid staff for aid stations. The membership generally was in agreement, the feeling being that the aid stations were good insurance.

Hospital Regulation by Army: A proposal from the OCD to transfer mental patients and city and county patients to Sacred Hearts Hospital and have Queen's Hospital interns rotate with Sacred Hearts met with much protest from the membership.

A special meeting of the Board of Governors and Council members of the Territorial Association was held in April to discuss with Dr. Arnold an impending military order which would place the control of patient admissions under an Army officer. It was the intention of the military to limit the number of useable beds in civilian hospitals and to shift patients in excess of this number to OCD and Army hospitals. The doctors protested vigorously any such move and felt that the same results could be accomplished without military order; that a civilian under Dr. Arnold could equally well regulate the situation. But in spite of the protest an Army officer was designated as controller of hospital admissions. More recently, however, this control has been relaxed because its enforcement would entail assumption of responsibility for any financial loss to the hospitals which might result.

Firemen—Medical Services: Recently the question of fees to be charged for medical services to firemen has come up repeatedly. It seems the society in 1934 agreed that its members render services to firemen at the Industrial Accident Fee schedule rates, under the following conditions:

"It being understood that no one receiving more than \$150 per month would be eligible for the service and it being assumed further that a physician entering into obligation for care of any member of this group under this schedule shall have guarantee of payment."

This matter was referred to the Committee on Forms of Medical Practice for consideration as to whether this practice should be continued.

Group Insurance: Dr. Benyas has been appointed a committee of one to explore the possibility of group insurance for physicians covering illness and disability.

NECROLOGY

Dr. Charles R. McLean was born in Princeton, Illinois, September 14, 1877 and died in Honolulu, August 7, 1942.

The many friends and associates of Mack, as he was popularly known, were prepared for his passing after his long illness of fifteen years. Those of us who knew him during his years of activity feel his loss keenly, for he leaves behind him the memory of a devotion to his profession, to this association, and a genuine friendship for all his associates.

He was a member of this association for about forty years, serving as its president in 1925, and his record of service should be an inspiration to all. I do not believe he ever missed a meeting of his medical society unless prevented by illness. Even when the attendance was scanty one could be certain that Mack would be on hand the first Friday evening of each month. Rain or shine he would drive in from Ewa. His friendship for his contemporaries was second only to his devotion to his profession. His cheerful smile, his warm handclasp, his lovable qualities endeared him to all.

We do not grieve for Mack, because his long illness inflicted too much suffering to will its outcome otherwise. His departure removes from our membership a personality that will not soon be forgotten nor easily replaced. It is love and respect for his character and personality that causes us to pause to pay tribute to his memory.

GROVER A. BATTEN, M.D.

PAPERS GIVEN AT THURSDAY MORNING CLINICS:

- Leprosy Lies—DR. A. G. LOVE
 Early Syphilis—DR. HARRY L. ARNOLD, JR.
 Public Health Aspects of Syphilis—DR. S. A. ALLISON.
 Syphilis in Pregnancy—DR. O. LEE SCHATTENBURG.
 Congenital Syphilis—DR. LOUISE CHILDS.
 Visceral Syphilis—MAJOR ROBERT HOAGLAND.
 Psychiatric Manifestations of Syphilis—DRS. E. E. McNIEL & WM. SHANAHAN.
 Neurosyphilis—DR. HAROLD M. JOHNSON.
 Serology in Syphilis:
 The Wasserman Reaction—DR. E. A. FENNEL.
 The Kahn Test—LT. COL. P. P. GREEN.
 The Kline Test—DR. LOUIS HIRSCH.
 A case of hyperemesis gravidarum (?).
 Thrombosis of portal & mesenteric vein.
 A case of peripheral neuritis.
 Three cases of muscular dystrophies—DR. R. B. CLOWARD.
 Tetanus—DR. STEELE F. STEWART.
 Tetanus—DR. F. J. HALFORD.
 Marfan's Disease:
 Case presentation—DR. W. J. HOLMES.
 X-ray findings—DR. L. L. BUZARD.
 A case of intussusception of ileum with complications.
 A case of Weil's disease—MAJOR R. J. HOAGLAND.
 Achrestic anemia—DR. T. F. FUJIWARA.
 A remarkable escape from death—DR. J. R. JUDD.
 A case of amebiasis.
 A case of subdiaphragmatic abscess.
 A case of axillary venous thrombosis—LT. COL. ARNOLD JENSEN.
 Calcifying intracranial neoplasms—DR. R. B. CLOWARD.
 Xanthomatosis, with some examples of disturbed lipid metabolism—DR. HAROLD JOHNSON.
 An extremely unusual obstetrical case with complications—DR. O. B. WARSHAUER.
 Surgical treatment of:
 Bronchiectasis
 Ulcerative colitis
 Hirschsprung's disease—DR. J. E. STRODE.
 Atypical pneumonia—MAJOR H. J. FRACHTMAN.
 Islet cell tumor of pancreas associated with bilateral renal calculi—LT. COMDR. PAUL C. SPANGLER.

ELIZABETH D. BOLLES, reporting

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* N. N. R. 1941, p. 328.

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NOTES AND NEWS

American Specialty Board Diplomates in Hawaii

Compiled from the Directory of American Specialty

DERMATOLOGY & SYPHILOLOGY:

Arnold, H. L., Jr.

INTERNAL MEDICINE:

Arnold, H. L., Sr.

Doolittle, S. E.

Duryea, A. W.

Larsen, N. P.

Molyneux, A. V.

Walker, H. H.

NEUROLOGICAL SURGERY:

Cloward, R. B.

OBSTETRICS & GYNECOLOGY:

Bowles, H. E.

OPHTHALMOLOGY:

Crawford, H. E. (Hilo)

Holmes, W. J.

Moffat, H. E.

Pinkerton, F. J.

Van Poole, G. M.

Cowan, T. W. (Kahului)

ORTHOPEDIC SURGERY:

Craig, A. L.

Stewart, S. F.

OTOLARYNGOLOGY:

Howarth, E. M.

Ikuta, S. K.

Pang, L. Q.

Pinkerton, F. J.

Van Poole, G. M.

PATHOLOGY:

Fennel, E. A.

Tessmer, C. F.

PEDIATRICS:

Gaudin, F. H.

Palma, J.

Wilbar, C. L.

PSYCHIATRY & NEUROLOGY:

Kepner, R. D.

McNiel, E. E.

RADIOLOGY:

Buzaid, L. L.

Schnack, A. G.

Smith, J. W.

SURGERY:

Alsup, F. F.

Strode, J. E.

UROLOGY:

Brown, R. O.

If change of residence or other factors have led to inadvertent omissions, we would appreciate being notified.

NEW MEMBERS

R. J. HOAGLAND, Cornell Univ. 1933 (service).

RICHARD L. MERKLE, Loyola, 1941 (service).

HAROLD M. SEXTON, Tufts College, 1941.

ALFRED S. HARTWELL, Harvard, 1938.

ELMER T. HOBBS, Univ. of Nebraska (service).

WILLIAM L. ZINK, Louisiana State, 1940 (service).

CYRUS YEE, renewed membership after returning from postgraduate work on the mainland.

LOUIS HIRSCH, changed from honorary to regular membership.

H. B. COOPER, changed from honorary to regular membership.

TAKEO FUJII, Creighton, 1939, has gone to Maunaloa, Molokai.

CLAGETT L. BECK, Johns Hopkins, 1935, transferred from Kauai to Honolulu.

FRANK S. LEE was transferred to Maui County from Honolulu.

DR. W. D. BALFOUR transferred from Hawaii to Maui County.

DR. FREDERICK GILES, DR. EDMUND ING and DR. LESLIE LUKE have been called to active duty with the Army Medical Corps.

DR. SAMUEL YEE was elected head of the Hawaii Chinese Civic Association recently. But better than that, he and Doris are to be congratulated on the arrival of their daughter, Judith, who arrived in October.

A paper by DR. O. LEE SCHATTENBURG on the relation of dentistry to obstetrics was published in the April issue of the Journal of the American Dental Association.

DR. ROBERT H. FISHBACK, U. S. P. H. S., has been assigned as acting associate director of the Bureau of Maternal and Child Health of the Board of Health. Dr. Fishback is a Nebraska graduate and came here from Norfolk, Virginia, in August, 1941.

DR. CORYDON M. WASSELL, whose heroism during and after the battle of Java has been so widely acclaimed, gave an account of his experiences at one of the Thursday morning clinics recently.

The American Journal of Psychiatry, Vol. 98, No. 5 (March 1942) carried a clinical note entitled "Kepner Method of Collecting Sputum from Psychotic Patients."

DR. RICHARD C. DURANT sent greeting, from Dedham, Mass., recently, indicating that he may be in the Navy soon.

DR. WILLIAM L. ZINK, U. S. P. H. S., has been assigned to operate the new mobile x-ray unit recently purchased by the Board of Health. Dr. Zink is also assisting in the venereal disease clinic at Palama Settlement. He is a Louisiana State University Medical School graduate.

California and Western Medicine carried comments by CAPT. HAYDEN on Pearl Harbor Hospital's experience with sulfanilamide.

John Milnor and Andy Morgan, sons of Dr. and Mrs. GUY C. MILNOR and Dr. and Mrs. JAMES A. MORGAN, graduated from Dartmouth on May 10 and have entered the medical schools of Temple and Cornell respectively.

Recently licensed to practice medicine in the Territory were: DRs. GEORGE M. HUTTO, F. D. NANCE, WILLIAM SHANAHAN, JOHN M. FELIX, RICHARD L. MERKLE, PETER S. WASHKO, WILLIAM L. JAMES, A. L. VASCONCELLOS, HAROLD M. SEXTON, and LOUIS HIRSCH.

DR. L. FERNANDEZ, formerly with the Honolulu Plantation, went to Hawaii in August to become associate physician at Pepeekeo Hospital with Dr. THOMAS KEAY.

DR. R. T. EKLUND left Pepeekeo in August to go to Pahala where he is head physician.

From make-shift and widely scattered quarters, the Honolulu Blood Bank moved in August into a building of its own, constructed especially for it on the grounds of the Queen's Hospital. The O. C. D. provided the funds to construct the building.

DR. WILLIAM ITO, member of Queen's Hospital staff, has recently been appointed to take over the Palama Settlement venereal disease clinic, replacing DRs. EDMUND ING and JOHN DEVEREUX.

In spite of the uncertainty attending returns to Hawaii under military regime, several of our physicians have taken the chance and made trips to the mainland. Among these were DR. PINKERTON, DR. HARALSON, DR. EDES ALSUP, DR. SPENCER, DR. HOLMES, DR. MITCHELL, DR. GASPAR, DR. MOSSMAN. DR. GASPAR enjoyed working his way back on a cattle boat.

DR. RICHARD D. KEPNER has been elected to fellowship in the American Psychiatric Association.

On November 15, MRS. WILLIAM FLEMING will join the staff of the Hospital Social Service Association as a medical social worker. She will give three days a week to the Queen's Hospital and three days to the Children's Hospital. It is hoped that attending physicians and staff doctors will feel free to avail themselves of her case work services.

DR. FRANCIS D. NANCE has joined the Medical Group.

DR. and MRS. M. OZAWA announced the arrival of their first child, a boy, in October.

DR. CYRUS W. YEE opened new offices in Honolulu early in October and will devote himself principally to eye work.

DR. NILS P. LARSEN has returned to the firing line of active work with the Medical Group after a prolonged absence on the mainland.

The Hawaii Territorial Society for Mental Hygiene came formally into being in September through the efforts of the Psychiatric Committee of the Territorial Medical Association.

DR. ALFRED S. HARTWELL has recently been appointed Medical Director for Queen's Hospital. DR. HARTWELL comes from an old kamaaina family. He is a graduate of Harvard Medical School.

DR. and MRS. COLIN MCCORRISTON returned recently from Boston. DR. MCCORRISTON has joined The Clinic's department of obstetrics.

SULFA DRUGS PLUS SULFUR SALVE

Lieutenant Commander Corydon M. Wassell, on his way through Honolulu from the Java Sea battle, was a guest of the Honolulu County Medical Society at a Thursday Morning Clinic meeting, where he related informally some of his experiences.

"I had the wounded from the Marblehead and Houston in my care. They were mostly second degree burns from bomb flashes, the heat of which is terrible. You could tell by the burned areas just what clothes the men had on. Being in the tropics some had very little clothing on, some V-necked shirts, some shorts, some you could see where their dungarees were rolled up half way. They used gun grease on some of the men, and I want to say here that these burns got along all right. Some were sprayed with tannic acid, on others they had used the triple dyes, and I cannot say that there was any difference in the end results of any of them.

"We took these men up to Central Java, where they have as good a hospital and personnel as you have here, and the Dutch gave us every assistance humanly possible. They came with an auto hospital train and carried the more severely wounded up to Their hospital trains are perfect hospitals, with operating room, fully equipped. I am sorry to say that we do not have such units in America.

"Some of the men were given salt baths and, with some, the triple dyes were continued. Sulfa drugs were given those who had infections. The infections were not bad, even though some had bad shrapnel wounds. They had only sulfanilamide and sulfapyridine, no sulfathiazole. When other preparations were used up, one of the Dutch doctors decided to try plain old sulphur ointment. They buttered it on strips and bandaged them on. Some of the dressings were left on for four or five days, and I am here to say that the end results were beautiful. I came out of Java on the first of March and had with me the Executive Officer of the Marblehead. His legs from his knees down were extremely badly burned, but the infection had been killed out. I had fresh sulphur ointment dressings put on. He seemed to get along so well that I did not re-dress him again until the sixteenth. The dressing came off easily, with no bleeding, no odor, no infection. There was practically complete healing of his wounds. I give you this as an example of leaving dressings on so long. I do not know what the end results would have been if there had been infection. Olive oil and cod liver oil were used in some dressings, olive oil and boric acid in others, but generally the dressings

that finally ended up with sulphur ointment gave the best results.

"I took 47 injured men ashore, of whom 42 survived. I do not believe any will have burn contractures. Some had stiff joints where an arm had been in a sling, but before they left me a little passive movement and massage was bringing back the full use of their arms.

"We left the southwest shores of Java on the motor ship Jansen, the last ship out of Java. We sailed about 6:45 in the evening. The ship was terribly overcrowded. We sailed along the south coast, within sight of shore. About 10 o'clock the next morning planes flew over. They passed us by and we thought we were safe, but in about half an hour three Zero fighters were over us. They poured it on. Eight of us were wounded, four seriously. We finally put into a little port and the majority of people left the ship. The only people left aboard aside from our group were the Dutch Navy technical personnel. When they started ashore I went to the wounded, of whom there were nine, and asked what they wanted to do—to stay aboard or go ashore. These boys said they would stick by the ship, and that is the kind of guts that brought us out. Instead of sailing south or southeast toward Australia, we sailed southwest. I never saw such a bright sun and such bright moonlight. We watched the air and the surface continually. The tension of anticipation was terrific. We were going seven and a half knots and that would have been duck soup for the Jap planes. You have no idea of how it feels to be so helpless. We had not a thing to shoot back at them with, we would have just had to sit and take it.

"To the Dutch and Australians I want to take off my hat for the manner in which they gave us help. Nothing was too good for us; they gave us anything we wanted.

"Coming across on the ship we had a Dutch first-aid man. I do not know how much medicine he knew. We had an English engineer with a badly infected leg from shrapnel. It was swollen, red, hot, throbbing, the inguinal glands were starting to swell, temperature 104, chills. I gave him sulfapyridine, enough for two days' treatment. As it turned out the Dutch first-aid man gave it to him in twenty-four hours in addition to some other tablets that I knew nothing about. The next morning I looked at him and could see he had a sulfa poisoning. He had in twenty-four hours about a six days' dose. I stopped everything and told him to take nothing but water. His temperature went down, and his leg cleared up, with no dressing or anything.

The much needed new quarters for the Mental Health Clinic at Queen's Hospital have been completed, providing ten additional clinic beds and office space for the staff. This addition was made possible from O. C. D. funds.

Too late to publish in the last issue of the JOURNAL we announce belatedly the marriage in July of DR. HARRY L. ARNOLD, JR. to Miss Jeanne Prevost, of Berkeley, California.

DR. LEON E. MERMOD announced the opening of offices in the Young Hotel Building on August 17.

The Japanese Hospital will no longer be known by that name: it is now the Kuakini Hospital.

DR. THOMAS R. WHITE, formerly intern at Queen's Hospital and a native of Haiku, Maui, has been awarded the Distinguished Flying Cross and the Military Order of China. He was with Brig. General Doolittle as flight surgeon during the bombing of Tokyo.

DR. C. J. KUSUNOKI, formerly health officer for Maui County, has come to Honolulu to practice.

DR. W. D. BALFOUR, formerly of Pahala, Hawaii, has been appointed plantation physician for the Wailuku Sugar Company and is now making his residence in Wailuku. DR. WILLIAM OSMERS, who held this position for the past 33 years, has been retained on the plantation medical staff as assistant physician. The many friends of DR. OSMERS will be delighted to know that he is completely recovered from his recent severe illness and able to attend to his duties once again.

MAJOR C. L. WILBAR, M. C., U. S. A., has been appointed County Health Officer for Maui County with headquarters in Wailuku.

DR. K. P. JONES, formerly of Kula Sanitarium, has moved to the mainland and is engaged in tuberculosis work in Southern California. His successor is DR. EDMUND TOMPKINS, until recently medical director of Puumaile Home on Hawaii. Dr. Tompkins and his wife and children have previously made their home on Maui.

DR. ROBERT G. BENSON, formerly of Mauna Loa, Molokai, has transferred his membership to the Honolulu County Medical Society.

Congratulations are due to DR. E. T. SHIMOKAWA of Lahaina on his marriage on June 28 to Miss Merle Michiko Okada of Paia.

DR. and MRS. JOHN SANDERS became the proud parents of a 6 pound 10 ounce son, John Michael, on July 21.

Little Marie Colette Seiler, weighing but 5 pounds 9½ ounces, made her appearance into this troubled world on July 29. DR. and MRS. SEILER had wanted a girl and evidently had a priority rating in this connection. Mother, daughter, and papa are all completely recovered from the ordeal.

The K. IZUMIS are now three since the birth of a 7½ pound boy on October 16th. The newcomer has been named Gerald K. Izumi. Mother and son doing nicely. Father's condition improving daily.

DR. GEORGE F. STRAUB has returned to The Clinic to resume the practice of general surgery, after a retirement of eight years.

"We gave sulfa drugs by mouth only when there was an infection because we were very short of them. Most of the drugs had been blown up and destroyed when the Japs came into Soerabaya. As far as I am concerned they can have all the quinine. I use Atabrine, having seen the results of it in Arkansas in the White River bottoms. We pushed malaria off the face of 11 camps in China by giving two tablets weekly, one on Tuesdays and one on Fridays for five years. However, on the Bataan peninsula and in Java you might be safer taking three tablets a week. I like it also for its compactness. A man can carry in his pack nearly a year's prophylactic supply, in a small bottle."

Ether Anesthesia Near Open Flames

Extract from "The Use of Bulk Ether in Anesthesia" by Harry Gold, M.D. Jour. A.M.A. Sept. 5, 1942, Vol. 120, No. 1, pp. 44-45.

"This danger (handling ether in a closed room) generally speaking, is extremely small. The National Board of Fire Underwriters states that the vapor from a quarter pound of ether will make 60 cubic feet of air explosive. This is approximately the minimal explosive concentration of ether vapor in air. We produced such an atmosphere in a laboratory room and found it almost unbearable for more than a few moments to several individuals who entered. One third of the minimal explosive concentration of ether vapor imparts a very strong odor of ether to the atmosphere. An atmosphere in which the odor of ether is faint is not explosive. The transfer of a 5 pound can of ether into small containers in a room of about 2,000 cubic feet (say 10' x 25' x 8') would not produce an explosive atmosphere even if the entire quantity escaped in the form of vapor evenly distributed throughout the room."

Considerable attention has been devoted to the problem of operating at night with ether anesthesia and no electric light available. Such a contingency is of course easily conceivable.

Ether is *highly* inflammable and its vapor, mixed with air is explosive. This is not an attempt to justify operating by lantern light with ether anesthesia.

It is probable, however, that the danger has been in the past somewhat exaggerated. The greatest dan-

ger is from the *inflammability* of the ether. Given a situation where lives would be lost without surgery, and ether and open flame were the only possible means, one should not hesitate to go ahead and operate, keeping the light as far as possible from the liquid ether and employing the maximum of ventilation available.

DR. DOUGLAS MURRY reports from one of the outposts that he is having a swell time fishing. He makes his rounds in a hat and shorts and a jeep.

DR. RODNEY WEST, somewhere in the Pacific, is trying to compose another Desert song. Someone sent him a piano and he's quite content.

A paper written jointly by LT. CMDR. JOE PALMA and LT. ENRIGHT describing blast injuries on the Seventh appeared in a recent issue of the U. S. Naval Medical Bulletin.

The annual clinical congress of the American College of Surgeons which was scheduled to be held in Cleveland, November 17-20th was cancelled.

DR. IVAR LARSEN of Kohala has returned to work after a vacation of two weeks spent prowling around Mauna Kea and the Kohala mountains.

DR. L. R. FERNANDEZ, formerly of Aiea, is now associated with DR. THOMAS KEAY at Pepeekeo Hospital.

DR. R. P. WIPPERMAN is now resident physician at Naalehu and is associated with Dr. R. T. EKLUND at the Pahala Hospital.

DR. H. E. CRAWFORD of Hilo has returned to work after spending a short vacation on the Kona side fishing, etc.

DR. HAROLD SEXTON of the Queen's Hospital Resident Staff is serving his two and one-half months field service with his father, Dr. L. L. SEXTON of Hilo, who plans to relax a bit while the younger Sexton is here.

DR. WM. F. LESLIE formerly of the staff of Leahi Home has arrived in Hilo and assumed the Superintendency of Puumale Home.

DR. A. T. ROLL, who has practiced on the Island of Hawaii for twenty-eight years, has returned to the Mainland for the duration at least. He was given a testimonial dinner at the Naniloa Hotel by the Hawaii County Medical Society on September 6th.

DR. M. F. HARALSON, Territorial Commissioner of Public Health, was a visitor to the Island of Hawaii the latter part of September. He was accompanied by Dr. M. H. FLINTER who has been assigned to this Island as Health Officer.

LIBRARY NOTES

RECENT ACCESSIONS

- ALICATA, JOSEPH E.: *A preliminary report of studies on typhus, leptospirosis and trichinosis in Honolulu.*
- ANDREWS, G. C.: *Diseases of the skin.*
- BAILEY, HAMILTON: *Surgery of modern warfare.*
- BAILEY, P.: *Intracranial tumors.*
- BARD, PHILIP: *MacLeod's physiology in modern medicine.*
- BECKMAN, HARRY: *Treatment in general practice.*
- BLALOCK, ALFRED: *Principles of surgical care.*
- BODANSKY, M. and BODANSKY, O.: *Biochemistry of disease.*
- BOYD, WILLIAM: *Pathology of internal diseases.*
- BUE, L. A.: *Principles of proctology.*
- Bureau of Maternal and Child Health—Practical Information for Use by Physicians, Nurses and Home Economists.*
- CALLANDER, C. L.: *Surgical anatomy.*
- CAMPBELL, W. C.: *Operative orthopedics.*
- CASTIGLIONI, A.: *A history of medicine.*
- CECIL, RUSSELL L.: *Textbook of medicine.*
- COLE, L. G. and COLE, W. G.: *Pneumoconosis (silicosis), the story of dusty lungs.*
- CROSSEN, H. S. and CROSSEN, R. J.: *Operative gynecology.*
- DAVISON, W. C.: *The compleat peditrician.*
- DEGENER, OTTO: *Ferns and Flowering Plants of Hawaii National Park. Flora Hawaiiensis, or New Illustrated Flora of the Hawaiian Islands.*
- GCEPP, R. M.: *Medical state board questions and answers.*
- GOLDEN, ROSS, Ed: *Diagnostic roentgenology.*
- GOODMAN, L. and GILMAN, A.: *Pharmacological basis of therapeutics.*
- HARRISON, T. R.: *Failure of circulation.*
- HARROWER, H. R.: *An endocrine handbook.*
- HASSIN, GEORGE B.: *Histopathology of the peripheral and central nervous system.*
- HERTZLER, A. F.: *The technique of local anesthesia.*
- HOLD, V. E. and HOWLAND, JOHN: *Diseases of infancy and childhood.*
- KEY, J. A. and CONWELL, H. E.: *The management of fractures, dislocations & sprains.*
- KRACKE, R. R.: *Diseases of the blood.*
- LEWIN, PHILIP: *Infantile paralysis.*
- LEWIS, SIR THOMAS: *Vascular disorders of the limbs.*
- MAY, C. H.: *Manual of the diseases of the eye.*
- NEWBURGH, L. H. and MACKINNON, FRANCES: *Practice of dietetics.*
- NORRIS, G. E. and LANDERS, H. R. M.: *Diseases of the chest and the principles of physical diagnosis.*
- PARDO-CASTELLO, V.: *Diseases of the nails.*
- PARK, W. H. and WILLIAMS, ANNA K.: *Pathogenic microorganisms.*
- PENFIELD, W. and ERICKSON, T. C.: *Epilepsy and cerebral localization.*
- RANKIN, F. W. and GRAHAM, A. S.: *Cancer of the colon and rectum.*
- RASMUSSEN, A. T.: *Principal nervous pathways.*
- SEVRINGHAUS, E. L.: *Endocrine therapy in general practice.*
- SHEEHAN, J. E.: *Manual of reparative plastic surgery.*
- SIGERIST, H. E.: *The great doctors.*
- SILER, J. F. and others: *Immunization to typhoid fever.*
- STITT, E. R.: *Practical bacteriology, hematology and animal parasitology.*
- STRONG, R. P.: *Stitt's Diagnosis, prevention and treatment of tropical diseases.*
- SUTTON, R. L. and SUTTON, R. L. JR.: *Diseases of the skin.*
- THOMAS, K. H.: *Clinical pathology of the jaws.*
- WATSON-JONES, R.: *Fractures and other bone and joint injuries.*
- WILLIUS, F. A. and KEYS, T. E.: *Cardiac classics.*
- YOUNG, J. B.: *Nutritional deficiencies.*
- ZINSSER, HANS, et al.: *Immunity, principles and application in medicine and public health.*

MEDICAL BOOKS

Complete Catalogue

Pursuant to requests from physicians on the outside islands, a complete list of the books in the medical library in the Mabel L. Smyth Memorial Building is printed herewith. In consideration of the assessment levied this year on doctors throughout the Territory, any of these books will be mailed to the other islands on request.

ALLERGY

- ROWE, A. H., *Clinical allergy*, 1937.
TUFT, LOUIS, *Clinical allergy*, 1937.

ANATOMY

- CUNNINGHAM'S *manual of practical anatomy*, 3 vols., 1919-1920.
DELAFIELD, F. AND PRUDDEN: *A handbook of pathological anatomy and histology*, 1892.
EYCLESHYMER, A. C. AND SHOEMAKER, D. M., *A cross-section anatomy*, 1930.
GRAY, HENRY, *Anatomy of the human body*, 1924.
JACKSON, C. M., *Morris's human anatomy*, 1921.
JOHNSTON, T. B., *A synopsis of regional anatomy*, 1928.
KIMBER, D. C., and others, *Textbook of anatomy and physiology*, 2 copies, 1926. 1939.
NANCREDE, CHARLES, *Essentials of anatomy*, 1913.
SPALTEHOLZ, WERNER, *Hand atlas of human anatomy*, 2 vols., 1900, 1901; 6 vols., 5th ed.

ANESTHESIA

- GURDEL, A. E., *Inhalation anesthesia*, 1937.
HERTZLER, A. E., *The technic of local anesthesia*, 1941.
HEMER, C. L., *Recent advances in anesthesia and analgesia*, 1932.
LABAT, G., *Regional anesthesia, its technic and clinical application*, 1923.
ROSE, J. S., *Handbook of anesthetics*, 1919. 1923.

BACTERIOLOGY

- Certified milk conferences*, 1927, 1930.
JORDAN, E. O. and BURROWS, WILLIAM: *Textbook of bacteriology*, 1941.
JORDAN, E. O.: *Textbook of general bacteriology*, 1909.
JORDAN, E. O. and FALK, I. S.: *The newer knowledge of bacteriology & immunology*, 1928.
PARK, W. H. and WILLIAMS, A. W.: *Pathogenic microorganisms*, 1939.
ZINSSER, HANS and BAYNE-JONES, S.: *A textbook of bacteriology*, 2 copies, 1934. 1939.

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BETTANY, G. T.: *Eminent doctors, their lives and their work*, v. 2, 1878.
BRIDGE, NORMAN: *The marching years*, 1920.
BURR, ANNA ROBESON: *Weir Mitchell, his life and letters*, 1929.
CUSHING, HARVEY: *The life of Sir William Osler*, 2 vols., 1926.
DIXON, EDWARD H.: *Scenes in the practice of a New York surgeon*, 1855.
DUNCAN, LOUIS C.: *Medical men in the American Revolution*, 1931.
HEISER, VICTOR: *An American doctor's odyssey, adventures in 45 countries*, 1936.
HERTZLER, A. E.: *Horse and buggy doctor*, 1938.

- MARTIN, FRANKLIN H.: *Fifty years of medicine and surgery*, 1934.
PEACOCK, A. H.: *Globe trotting with a surgeon*, 1936.
SIGERIST, HENRY E.: *The great doctors—a biographical history of medicine*, 1933.
WINSLOW, C. E. A.: *The life of Hermann M. Biggs, physician and statesman of the public health*, 1929.

CHEMISTRY

- AUSTIN, J. H. and CULLEN, G. E.: *Hydrogen ion concentration of the blood in health and disease*, 1926.
BODANSKY, M. and BODANSKY, O.: *Biochemistry of disease*, 1940.
MCCOLLUM, E. V.: *Organic chemistry*, 1916.
PETERS, J. P. and VAN SLYKE, D. D.: *Quantitative clinical chemistry*, 2 vols., 1932.
STIEGLITZ, JULIUS: *Chemistry in medicine*, 1929.
WATTS, W. M.: *Organic chemistry*, 1873.
WURTZ, A.: *Elements of modern chemistry*, 1892.
YOUNG, J.: *A course of practical chemistry, quantitative and qualitative*, 1914.

CLINICAL MEDICINE

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BEAUMONT, G. E. and DODDS, E. C.: *Recent advances in medicine*, 1936.
BRUNTON, SIR LAUDER: *Therapeutics of the circulation*, 1914.
BUIE, L. A.: *Practical proctology*, 1938.
CABOT, RICHARD: *Differential diagnosis*, 2 vols., 1920, 1921.
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CAMPBELL, C. M.: *The lazy colon*, 1928.
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EAST, T. and BAIN, C.: *Recent advances in cardiology*, 1936.
EUSTERMAN, G. B. and BALFOUR, D. C.: *The stomach and duodenum*, 1935.
Fifth Avenue Hospital Clinic, 1927.
FISHBERG, A. M.: *Hypertension and nephritis*, 1934.
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- HUTCHISON, R. and HUNTER, D.: *Clinical methods*, 1932.
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- JOSLIN, ELLIOT P.: *Treatment of diabetes mellitus*, 1928.
- KRAETZER, A. F.: *Procedure in examination of the lungs*, 1935.
- LENZMANN, RICHARD: *Emergencies in medical practice, the pathology and treatment of morbid conditions that may suddenly endanger life*, 1915.
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- BRIDGES, M. A.: *Dietetics for the clinician*, 1937.
- CHRISTIE, C. D. and others: *Dietary suggestions*, 1930.
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LEPTOSPIROSIS

MAJOR ROBERT J. HOAGLAND, M. C., U. S. A.

CAPTAIN FRANK H. HARRIS, M. C., A. U. S.

AND

STEVEN S. CHINEN

•

A SURVEY OF LEPTOSPIROSIS IN HONOLULU

JOSEPH E. ALICATA, PH. D.

AND

VIRGINIA BREAKS, B. A.

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SPLENOMEGALY

S. E. DOOLITTLE, M. D.





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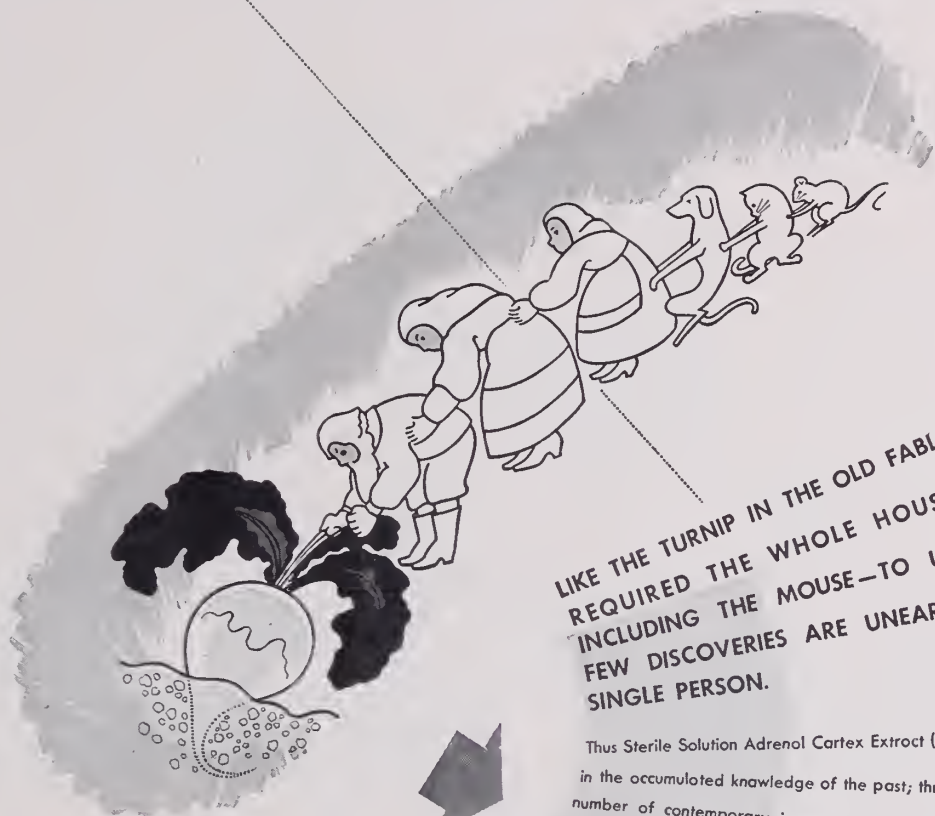
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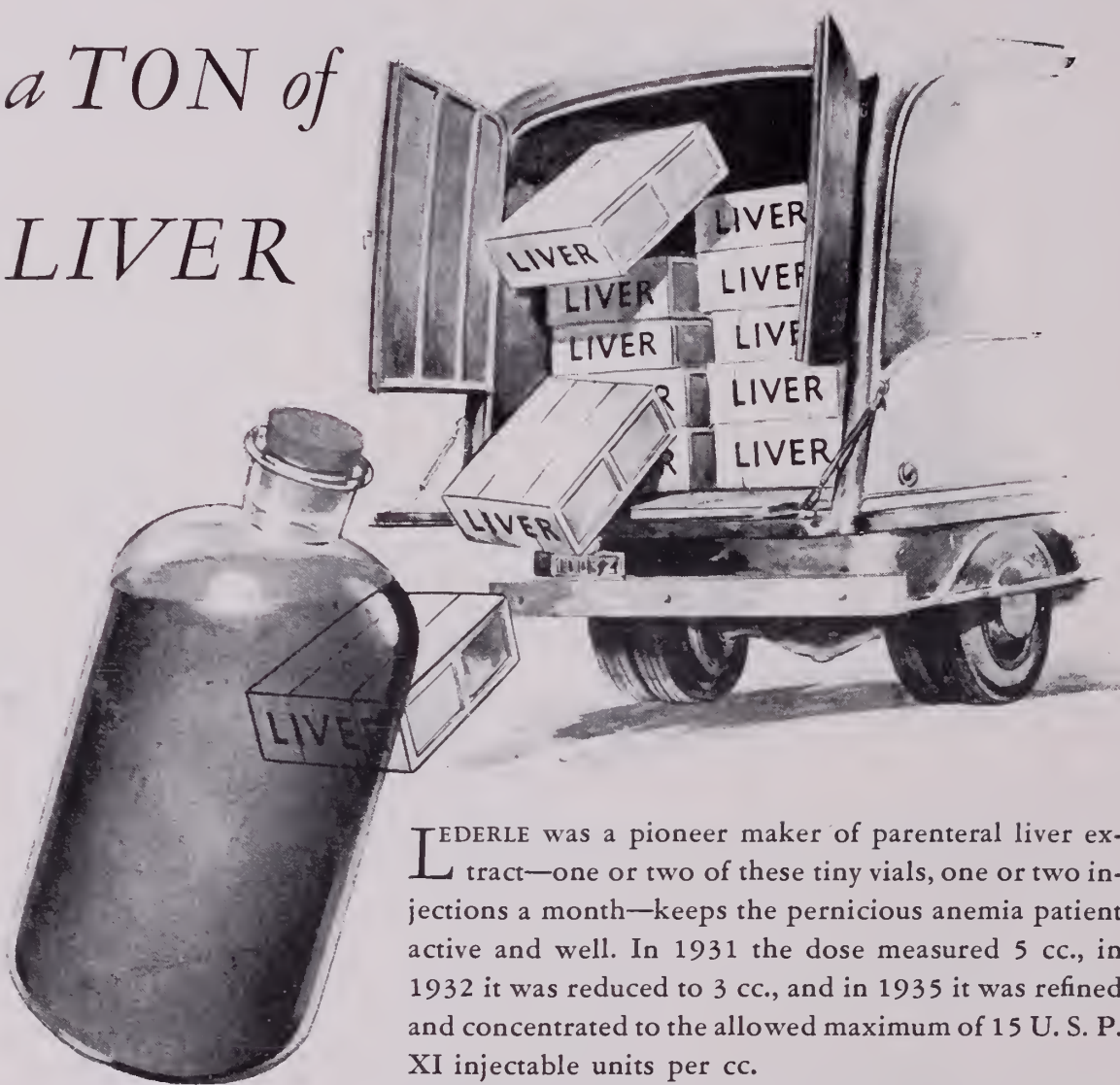
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Leptospirosis (Weil's Disease)

ROBERT J. HOAGLAND, MAJOR, M.C., U.S.A.,

FRANK H. HARRIS, CAPTAIN, M.C., A.U.S.

AND

STEVEN S. CHINEN

Honolulu

Leptospirosis icterohemorrhagiae is of special interest at this time because it may be confused with what has been termed "acute infectious hepatitis," a disease seen in large numbers lately. Since many cases of leptospirosis occurred during the first world war¹ and since many rats in the Territory of Hawaii are infected with leptospirae², Weil's disease is likely to be encountered by medical officers in the military service, especially by those in this Territory.

INCIDENCE

A complete review of the American literature³ in 1941 mentioned only 67 cases of Weil's disease. Stiles and Sawyer⁴ in an article published this year tabulated 73 authentic cases of *Leptospira* infection in North America, of which four cases occurred in Canada, and the remainder in thirteen of the United States and in the District of Columbia. In addition, 57 cases of Weil's disease were reported by Enright and Fennel⁵ to have occurred in the Territory of Hawaii between 1936 and 1938. The Hawaiian Territorial Board of Health has reports of 27 cases occurring between 1938 and June 30, 1942.⁶ Not all of these Hawaiian cases were confirmed by animal inoculation or agglutination tests. Enright and Fennel state, however, that a sufficiently large number were confirmed by laboratory methods and that the clinical diagnoses were made by competent physicians. Between 1924 and 1938 there were 852 reported cases of Weil's disease in the Netherlands⁷; and between 1933 and 1939, there were reports of 206 cases in Great Britain⁸. Despite the fact that relatively few cases of *leptospira* infection have been reported in the United States, the disease is by no means uncommon and will probably occur increasingly during this war as it did in the first World War; for infected rats are almost omnipresent, and soldiers will be exposed to contaminated streams, ditches, caves, tunnels, and trenches the world over.

MODE OF INFECTION

Most cases of Weil's disease result from contact with water or objects contaminated with spirochete-containing urine, usually rat urine. The percentage

of rats found infected with leptospirae varies considerably. For example, the rate of infection in various parts of England between 1918 and 1922 varied between 4 and 41 per cent.

It is worth commenting on the fact that whereas many animals are susceptible to leptospirosis, the domestic mouse does not seem to acquire the infection in nature. Possibly rats become infected because they frequent places containing stagnant water, whereas domestic mice do not. It is probable that *leptospira* infection can occur through intact skin, but it is more likely to follow contact of abraded skin with contaminated water. Rarely it results from bites of rats or other infected animals.

Most of the cases of leptospirosis reported in Hawaii were in laborers who worked in irrigated cane fields, which were heavily infested with rats. Struggling or swimming in contaminated water has caused many infections, probably as a result of aspiration. Whether or not infection may result from drinking polluted water is problematic. *Leptospirae* are susceptible to various digestive enzymes and to acids, hence it may be presumed that they will be destroyed by the time they reach the jejunum. However, infection via buccal or esophageal mucous membrane is possible. Stiles and Sawyer state that a frequently quoted epidemic alleged to have resulted from drinking contaminated water is unproved. The occupations having the highest incidence of Weil's disease include miners, fish handlers, and workers in sewers, irrigated fields and dairies. Almost always the source of the patient's infection can be traced to his occupation, recreation, or home conditions.

CLINICAL MANIFESTATIONS

The incubation period is four to twenty days. Weil's disease is customarily divided into three stages: the first, febrile, or septicemic; the second, or toxic; and the third, or convalescent, stage. The first stage usually lasts five to seven days. It is characterized by a sudden onset of symptoms suggesting severe influenza: namely, fever, chilliness, headache, and severe, generalized muscular pains, most pronounced

in the legs and back. Abdominal pain, nausea, and vomiting may be present, but they are usually overshadowed by the symptoms of influenza. The patient experiences intense pain in his calf muscles when he attempts to stand or walk. These muscles are usually exquisitely tender.

Conjunctivitis was present in 79 per cent of a series of 104 cases reported by Davidson and Smith⁸. Hemorrhagic manifestations such as purpura, hematemeses, hemoptysis, or epistaxis were present in 76 per cent of these cases; meningeal signs in 9 per cent, enlarged liver in 26 per cent, and palpable spleen in 0.9 per cent.

Jaundice, which is said to be absent in half of the cases of Weil's disease,¹⁻⁸ occurred in 65 per cent of Davidson and Smith's series. Icterus is observable during the end of the first stage or in the beginning of the second stage of the illness. During the latter stage, which lasts from seven to ten days, the temperature returns to normal. Death is more likely to occur in this stage than in the others.

The third stage is a period of convalescence during which icterus and any remaining symptoms disappear. A secondary rise of temperature occurs in about half of the cases during the third week of illness⁸.

Mortality rates have been reported to vary from 5 to 40 per cent in Europe and up to 70 per cent in Japan. Davidson and Smith believe that the likelihood of recovery is, roughly, inversely proportional to the degree of hyperazotemia, and is not decreased by the presence of meningitic symptoms.

LABORATORY INVESTIGATIONS

Examinations during the first stage will show a leukocytosis of 10,000 to 30,000 with a relative increase of neutrophils. In severe cases there is a decrease in the number of red blood cells and in the blood hemoglobin. The blood urea nitrogen is usually at least 40 mgm., and may be as high as 397 mgm., per hundred cubic centimeters⁸. Hyperazotemia begins during the first stage and usually declines during the second stage of the illness. The erythrocyte sedimentation rate is greatly accelerated. The icterus index begins to rise around the fifth to eighth day. Its rise is very rapid. The patient's urine usually contains albumin and casts, and frequently contains red blood cells. Bile and urobilin are detectable in the urine of jaundiced patients.

The cerebrospinal fluid of patients with meningitic manifestations contains slightly or moderately increased protein and usually from 30 to 250 cells, which early are mainly polymorphonuclears, and later

are lymphocytes. Whether or not leptospirae can be demonstrated in this fluid is controversial.

As in typhoid fever, the first week of Weil's disease is the bacteremic phase, during which organisms can be isolated from the patient's blood, while the second week is the period of antibody formation, during which agglutination tests give positive results.

For an absolute diagnosis of Weil's disease, *Leptospira icterohemorrhagiae* must be isolated by inoculating media (of which the most convenient are Fletcher's, Vervoort's or Noguchi's serum medium) with the patient's blood or urine; or the primary isolation of the spirochete may be made from liver or kidneys of young guinea pigs or American deer mice which have been inoculated with the patient's blood or urine.

Davidson and Smith found that up to the fourth day of illness the spirochetes were recovered from the blood of all of 17 cases. After the fourth day the chance of recovering organisms decreased; and after the eighth day they were infrequently found in the blood. Zinsser and Jones⁹ state that the organism can be recovered from patients' urine during the third week of illness; and that on the nineteenth and twentieth days urine is most likely to contain the bacteria. According to Fennel¹⁰ they usually disappear from the urine about the fortieth day of the disease, but some patients continue to excrete the organisms up to the sixty-third day.

During the first week of illness, the diagnosis may be established by injecting 3 to 5 cc. of blood into the peritoneal cavity of guinea pigs. Fennel recommends that the inoculation take place immediately after withdrawing blood, but if this can not be done, clotted blood, not citrated blood, should be sent to the laboratory. The reason for the warning against the use of citrated blood is that concentrations of citrate as low as 0.5 to 1 per cent affect leptospirae adversely. However, Davidson and Smith state that they injected blood clot into young guinea pigs and obtained positive results. Infected guinea pigs become febrile about twenty-four hours after injection, and usually die. The duration of their illness depends on the number of spirochetes injected and on the virulence of the strain. An intense jaundice develops toward the end of the disease. Animals inoculated with blood from patients may live for ten or more days. If the animal fails to die, its blood can be tested for agglutinins; and a suspension of its kidneys may be inoculated into other guinea pigs.

The pathologic changes in guinea pigs and in humans are similar. In brief, these changes consist of a jaundiced appearance of most of the tissues in addition to edema and hemorrhages in the lungs, intestines, adrenals, kidneys and striated muscles, and in the fat of the crural and axillary regions.

Among the various histologic changes are: (1) fatty degeneration and necrosis of the liver, together with stasis in biliary capillaries and slight leukocytic and lymphocytic infiltration; (2) swelling and necrosis of the epithelium of the convoluted tubules of the kidneys, with numerous casts; (3) hemorrhagic infarcts of the lungs; and (4) hemorrhages in the adrenals, calf muscles, and, less often, in skeletal muscles. Kidney and liver sections often reveal leptospirae. The mechanism that produces these changes is unknown. Haschec and Tobey¹¹ state that the damage is produced by toxic action of the spirochetes.

It has been said that the diagnosis of Weil's disease may be based on the characteristic clinical picture and certain laboratory tests, among which darkfield examination of blood and of urine are most important¹². Stiles and Sawyer agree with Fennel that darkfield microscopy is unreliable. The presence of confusing artifacts in blood and even urine may lead to the erroneous diagnosis of Weil's disease.

A laboratory method of diagnosis not described in the literature available to us was used in the case reported below. Sixty cc. of urine was centrifuged at high speed for five minutes. The supernatant fluid was discarded leaving about .25 cc. of sediment in the test tube. A loopful of this was placed on a slide and stained for spirochetes using Fontana's method. The stained organisms were easily distinguished.

Several immunologic reactions are valuable in establishing the diagnosis of leptospirosis. The agglutination test, similar to the typhoid agglutination test, is most commonly used. Agglutination reactions can be recognized after two hours of incubation at 30 C. The preparation of the antigen is described by Packchanian.¹³ A set for the performance of agglutination tests is manufactured by Lederle.

Agglutination, in a dilution of 1:300, strongly suggests the diagnosis of Weil's disease.¹² This titer is usually present during the second week of illness. Inasmuch as an individual's blood will give agglutination reactions for many years after infection (which may have gone unrecognized), a rise in titer should be obtained before the diagnosis of leptospirosis is made on this basis.

DIFFERENTIAL DIAGNOSIS

Jaundice is present in many diseases which are very easily differentiated from Weil's disease. Therefore, this discussion will be confined to those diseases more likely to be confused with leptospirosis.

Inasmuch as our patient was admitted to the hospital with the diagnosis of "acute infectious hepatitis," and since the latter condition has been seen so frequently during the past few months, the differential diagnosis between it and leptospirosis is especially important.

"Acute infectious hepatitis" is a disease of unknown etiology with symptoms identical to those present in the syndrome which has been called acute catarrhal jaundice. Ordinarily patients with "acute infectious hepatitis" or with acute catarrhal jaundice have few complaints. Lassitude, anorexia, slight abdominal distress, nausea, and occasional vomiting comprise the subjective manifestations. Often patients do not seek medical attention until their sclerae are observed to be yellow.

On the other hand, patients with leptospirosis usually become ill suddenly with a prostrating malady which closely resembles severe influenza, and seek medical attention before jaundice sets in. Icterus becomes deeper more rapidly in Weil's disease than in acute hepatitis. Severe muscular pain and tenderness, especially of the back and calf muscles, should lead to the suspicion of the existence of leptospirosis. If conjunctivitis and hemorrhagic and meningitic manifestations are present, the suspicion is strengthened.

In studying 60 cases of "acute infectious hepatitis" (the total admitted to this hospital during this year), the white blood cell count was found to be 10,000 or higher in only 2 cases, and the highest count was 12,800. In neither of these cases did neutrophils exceed 60 per cent of the total of white blood cells. As a rule white blood cell counts were less than 7,000. On the other hand, leukocytosis is characteristic of Weil's disease. The presence of hyperazotemia and a rapid sedimentation rate aid greatly in establishing a diagnosis of Weil's disease. Albuminuria is characteristic of Weil's disease, but of our 60 cases of "acute infectious hepatitis" only one had more than a trace of albumin in his urine. Of course, animal inoculation and immunologic tests will, in the end, differentiate leptospirosis from all of the similar diseases under discussion.

Although mild cases of Weil's disease may be confused with "acute infectious hepatitis," there

should, as a rule, be little difficulty in differentiating between these two diseases.

The clinical differentiation between leptospirosis and yellow fever or jungle yellow fever is very difficult. Severe cases of Weil's disease may be indistinguishable from yellow fever. It is of interest that Noguchi was led to believe that a spirochete was the cause of yellow fever because he examined the blood of patients with Weil's disease in the erroneous belief that they had yellow fever. Geographic limitations on the occurrence of yellow fever will often rule out this disease. The course of the temperature is somewhat different in the two diseases. In yellow fever, after two or three days, there occurs a remission lasting from three to forty-eight hours, which is followed by a relapse during which a marked relative bradycardia is present (Fager's sign). Otherwise the symptoms are the same as in the initial period of fever. The second febrile period lasts from two to five days.

Probably of greatest value in the differential diagnosis is the white blood cell count, for leukopenia is the rule in yellow fever. Albuminuria occurs in both diseases, but appears earlier in yellow fever and becomes more severe each day. Inasmuch as death or recovery will have taken place before the results of mouse inoculation and protection tests are available, these procedures have little practical value.

The clinical differentiation between leptospirosis and relapsing fever also is very difficult. Fever, jaundice, hemorrhage, muscular pain, and signs of meningitis are common to both diseases. The first febrile period in relapsing fever, and the first stage of Weil's disease, both last about six days; relapses occur in both diseases during the third week. The spleen and liver are said to be enlarged in relapsing fever, whereas the former is rarely, and the latter is not usually, enlarged in leptospirosis. Leukocytosis is present in both diseases. The diagnosis of relapsing fever is based on finding large spirochetes in stained films of blood taken during relapses.

Weil's disease may be confused with septicemia in which jaundice is a symptom. Helpful in differential diagnosis are the presence of intense muscle pain and tenderness in the former and a positive blood culture in the latter. Sometimes the jaundiced patient who has septicemia does not have choluria.

Acute yellow atrophy should be differentiated rather easily because it usually begins as a mild disease with symptoms similar to those described as

occurring in "acute infectious hepatitis." The patient with acute yellow atrophy becomes worse at a time, after two or three weeks, when the patient with leptospirosis is recovering. A diminution in the extent of liver dulness, and the presence of leucine and tyrosin crystals in the urine, are of diagnostic aid.

TREATMENT

Antiserum obtained from horses which have been inoculated with leptospirae is said to have produced favorable effects¹¹. However, the results available to us are not such as to warrant any degree of enthusiasm concerning this form of treatment. The serum is injected intravenously in doses of 60 cc. Inasmuch as it is said to be most efficacious in the first week of illness, and since the diagnosis of leptospirosis will usually be made after the patient has been ill one week, our skepticism regarding this form of treatment appears to be justified. Serum from convalescent patients also has been used in treatment.

Arsenicals are ineffective²¹. Bismuth has been used without proven good effects.

Obviously the treatment of a disease whose mortality rate without specific treatment varies so widely can be evaluated only if a considerable number of cases are treated under controlled conditions. Until such time treatment must remain symptomatic.

The usual contagious-disease precautions should be taken by ward personnel. The patient should be isolated and should wash his hands with 1 per cent cresol solution after each urination. His urine should be disinfected before it is disposed of.

Inasmuch as leptospirae are susceptible to acids, it may be possible to end the urinary carrier state more rapidly by administering mandelic acid and urine-acidifying drugs. It is impractical to isolate the patient in a hospital until it can be proved that his urine no longer contains leptospirae. However, the patient can easily continue his posturination hand-washing for several months.

REPORT OF CASE

B. D., a 25 year old white airplane mechanic, entered the Territory of Hawaii in May, 1942, and was admitted to this hospital eight weeks later, on July 20, 1942.

His family history and past history were irrelevant. Thirteen days before the onset of his illness, he swam in a stream along whose banks rats showing 10 per cent incidence of *Leptospira* infestation had been trapped. On July 14 his illness began, with listlessness, abdominal cramps, and nausea. These symptoms persisted until admission. On the fifth

day of his disease severe pain and tenderness were noticed in the muscles of both legs; and on the next day his sclerae became yellow and his feces light tan. Nose bleed and other hemorrhagic manifestations were absent. After he had been sick six days he was admitted to this hospital. He was believed to have "acute infectious hepatitis" by the physician who admitted him.

Physical examination showed no abnormalities except a fever of 101.4 F., yellow sclerae, tenderness of back and calf muscles, slight nuchal rigidity, and slight, generalized enlargement of lymph nodes.

His temperature became normal on the tenth day of illness and remained normal thereafter. Jaundice increased rapidly in intensity until the tenth day, after which it began to subside slowly. It disappeared completely seven weeks after his illness had begun. All other symptoms subsided shortly after admission; and after two weeks, he felt entirely well except for moderate weakness.

On the day of admission (the seventh day of his illness) his white blood count was 16,500 with 79 per cent polymorphonuclear cells. Red blood cell count and hemoglobin level were normal. A blood count on the next day gave similar results. The erythrocyte sedimentation rate on admission was 108 mm. at the end of an hour. Icterus index on July 21 was 100 and six days later was 56. Blood non-protein nitrogen was 75 mgm. per cent on the ninth day of his illness and 60 mgm. per cent on the fourteenth day. The Wassermann reaction of his blood was negative. Prothrombin time was normal.

Urinalysis on admission showed albuminuria three plus, bile, urobilin, and a few casts. Subsequent urinalyses showed a gradual decrease in albumin, and casts soon disappeared.

Agglutination tests performed on the ninth and fourteenth days of the patient's disease by Dr. J. E. Alicata of the University of Hawaii's Parasitology Department were positive in dilutions of 1:300 and 1:30,000 respectively. Dr. Alicata used his own cultures of *Leptospira icterohemorrhagiae* in performing these tests.

On the ninth day of the patient's illness his blood was injected into the groins of three young guinea pigs. Two animals received injection of 6 cc., and the third animal an injection of 1 cc. Ulcers appeared at the sites of inoculation five days later. Material taken from the bases of the ulcers was examined by darkfield microscopy and after staining by Fontana's method. Morphologically typical leptospirae were disclosed by both methods of examination. The ulcer of the guinea pig which was inoculated with only 1 cc. of blood was small, and material from its base disclosed few leptospirae.

On six occasions, between the tenth and twenty-fourth days of the patient's illness, urine sediment was inoculated into the peritoneal cavities of guinea pigs. The animal inoculated with urine obtained on the nineteenth day of the patient's illness developed jaundice and died thirteen days after injection. This animal's liver was ground up and inoculated into the peritoneal cavity of a second guinea pig, which became very ill and deeply jaundiced, and was killed a week after inoculation. Material from this animal's liver was placed on artificial culture media. Leptospirae were found on these media. Stained sections of the animal's liver showed numerous leptospirae.

Sediment obtained after centrifugation of the patient's urine was stained by Fontana's method and examined microscopically. Daily examinations revealed no organisms until the eighteenth day of illness. Between the eighteenth and twenty-ninth days, inclusive, examinations disclosed the presence of morphologically typical leptospirae except during a period of three days when the patient was receiving mandelic acid. No organisms were seen after the twenty-ninth day of the disease.

SUMMARY

(1) Leptospirosis is a disease which will probably be encountered increasingly during this war as it was in the first World War. It should be suspected when jaundice, fever, severe muscle pain and tenderness, conjunctivitis, and hemorrhagic manifestations are present. However, it must be remembered that jaundice is absent in 35 to 50 per cent of the cases.

(2) Typical laboratory findings include leukocytosis of 10,000 to 30,000 cells per cubic millimeter of blood with a relative increase of neutrophils, accelerated erythrocyte sedimentation rate, hyperazotemia, and hypercholeemia.

(3) During the first week of illness leptospirae may be isolated from the patient's blood by inoculating artificial culture media or young guinea pigs; and during the third week of illness the organisms may be isolated similarly from urine. After the first week of illness agglutination tests give positive results, with titers frequently over 1:10,000. Agglutination in a dilution of 1:300 is diagnostic if a rising titer is observed.

(4) The microscopic examination of urine sediment stained by Fontana's method is likely to disclose organisms during the third and fourth weeks of illness.

(5) The clinical manifestations of leptospirosis, yellow fever, and relapsing fever are similar.

(6) The results of treatment are difficult to evaluate.

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U.S. Army Provisional Hospital No. 3
Kuakini Hospital



A Survey of Leptospirosis in Honolulu

JOSEPH E. ALICATA, PH.D., AND VIRGINIA BREAKS, B.A.

Honolulu

Leptospirosis has been a subject of medical interest in the Hawaiian Islands, especially since 1936, when the causative organism was first isolated from a human case and reported by the senior author¹. Its presence had been suspected as early as 1921, at which time 5 deaths ascribed to Weil's disease were reported to the Territorial Board of Health; the diagnoses of these cases were made on the basis of clinical observations, however, and were not confirmed by laboratory findings. In the course of a six-year period (1936-1942) there have been reported to the Territorial Board of Health 82 cases of leptospirosis, as follows: Hawaii 59; Kauai 4; Lanai 14; Maui 1; and Oahu 4.

Because of the local importance of this and other rodent-borne diseases, funds were appropriated by the Public Health Committee of the Chamber of Commerce of Honolulu, to ascertain, among other things, the extent of leptospiral infection in man, and in animals (rats, dogs, cats, mongooses) serving as reservoirs of the disease. The object of this paper is to report the findings of this survey.

METHODS

The information on the incidence of leptospiral infections in humans, dogs and cats was secured as a result of microscopic agglutination tests made on their sera. The human sera were obtained at random at various hospitals and other institutions in Honolulu. The sera from dogs and cats were also obtained at random, largely from stray animals. Each of the sera was tested for the presence of agglutinins against *Leptospira icterohemorrhagiae* ("classical" strain), and *L. canicola* antigens. Each antigen consisted of fresh formalin-killed four to six day old leptospirae grown in Verwoort's medium (see appendices A and B). The method outlined by Meyer, Stewart-Anderson and Eddie⁷ was adopted. In general, this consisted of a series of dilutions, with Verwoort's buffer solution and the antigen, of the serum to be tested. The final dilutions ranged from 1:10 to 1:30,000 (see appendix B). These were incubated from three to four hours at 37°C., and the presence of agglutination was ascertained by the use of a darkfield.

The computation of the incidence of murine leptospirosis was based on the examination of silver-stained kidney sections of 350 rats trapped in seven districts of Honolulu. In the process of trapping rats by the use of cage traps, occasionally mon-

gooses were caught. In a few instances the kidneys of these animals were also sectioned and examined. The silver-staining method adopted was largely similar to the one described by Meyer and co-workers⁷ (see Appendix C).

RESULTS

Agglutination tests in sera of humans. Through the cooperation of The Queen's Hospital, Kuakini Hospital, Leahi Hospital, Palama Settlement and the Medical Milk Commission, blood specimens were obtained from 344 adult persons constituting 199 males, 116 females and 29 unknown (table 1). The racial grouping of these persons was as follows: Caucasian 119, Chinese 24, Filipino 38, Hawaiian and part Hawaiian 58, Japanese 64, Korean 6, Puerto Rican 21, and unknown 14. The serologic agglutination tests revealed 12 positive for *L. icterohemorrhagiae* and 1 for *L. canicola*. Of the 12 cases 9 were males and 3 females. By race they were distributed as follows: Caucasian 1, Filipino 2, Hawaiian 3, Japanese 2, Korean 2, Puerto Rican 2. The occupations were as follows: laborers 2, plantation workers 2, dairyman 1, unknown 7. The case positive for *L. canicola* was a Chinese-Hawaiian employed in the city park department. A recent medical history of 4 of these cases was negative for leptospirosis; no history was available for the other patients.

Agglutination tests in sera of dogs and cats. As summarized in table 1, of the 100 dogs examined, 20 gave positive reactions to *L. icterohemorrhagiae* and 19 to *L. canicola*. Those reacting to *L. icterohemorrhagiae* showed the following titers: 1 in 1:100, 15 in 1:300, 2 in 1:1,000, 1 in 1:10,000, and 1 in 1:30,000. Those reacting to the *canicola* strain showed the following titers: 1 in 1:100, 7 in 1:300, 5 in 1:1,000, 1 in 1:10,000, and 5 in 1:30,000. Those cases in which the titer was between 1:100 and 1:1,000 and the animals appeared normal were considered as latent infections. Five of these animals showed illness at the time of examination and may therefore have represented an early stage of the disease; sufficient time may not have elapsed for agglutinins to develop in larger amounts. The 8 cases in which the agglutination titer was between 1:10,000 and 1:30,000 are regarded as active clinical cases. Of these, the 2 dogs reacting to the classical strain showed jaundice, whereas the 6 dogs re-

Table 1. Summary of leptospiral agglutination tests in sera of human and canine origin.

Number and origin of serum examined	Leptospira strain used for the test	Number and titer of positive sera						Total positive
		1:100	1:300	1:1,000	1:3,000	1:10,000	1:30,000	
344 human sera	<i>L. icterohemorrhagiae</i>	6	5	1	0	0	0	12
	<i>L. canicola</i>	0	1	0	0	0	0	1
100 dog sera	<i>L. icterohemorrhagiae</i>	1	15	2	0	1	1	20
	<i>L. canicola</i>	1	7	5	0	1	5	19

Table 2. *Leptospira* infection as determined by the examination of kidneys of rats trapped in various districts of Honolulu.

Origin of rats	Total number examined	Number positive	Percent positive	Species of rats examined (Number infected in parentheses)			
				<i>R. norvegicus</i>	<i>R. rattus alexandrinus</i>	<i>R. rattus rattus</i>	<i>R. hawaiiensis</i>
Waianae	50	0	0	39	2	9	0
Waikiki	50	0	0	18	29	3	0
Manoa	50	1	2.0	33 (1)	7	10	0
Downtown	50	3	6.0	41 (3)	5	4	0
Kalihi	50	1	2.0	28 (1)	11	11	0
Kamehameha Heights	50	4	8.0	34 (4)	8	8	0
Kahala	50	1	2.0	4	38 (1)	8	0
Total	350	10	2.9	197 (9)	100 (1)	53	0

Rats trapped along fresh water streams in Honolulu.

Nuuanu stream	53	6	11.3	23 (5)	15 (1)	5	10
Kalihi stream	23	2	8.7	11 (2)	2	6	4
Palolo stream	21	0	0	2	14	3	2
Total	97	8	8.2	36 (7)	31 (1)	14	16

acting to the canicola strain were anicteric and exhibited, in most cases, general malaise, muscular tremor and dehydration. A more detailed account of these cases was recently reported by Alicata and Breaks.³

Agglutination tests conducted on the sera of 100 cats gave in all cases negative results.

Leptospiral infection in wild rats and mongooses. As indicated in table 2, 350 rats were trapped in seven of the larger districts of Honolulu. Silver-stained sections made from the kidneys of these rats revealed an average of 2.9 per cent infection (fig. 1, A-C). In addition, 97 rats were trapped along the banks of three fresh-water streams in

the city. Sections of kidneys of these animals showed an average of 8.2 per cent infection. Of 12 mongooses which were also trapped along the Nuuanu stream, 4 showed leptospirae in kidney sections (fig. 1, D).

DISCUSSION

Serum samples of 344 humans were examined for the presence of *Leptospira* agglutinins. Of these 6 showed positive reaction to a titer of 1:300 or more, and 6 to a titer of 1:100; in addition, one serum agglutinated *L. canicola* antigen in a dilution of 1:300. Agglutination tests in the diagnosis of leptospirosis are considered as highly specific. These

tests have been utilized by many workers, including Greene⁵, Larson⁶, Meyer and co-workers⁷, Packchianian⁸, Tiffany and Martorana¹¹, Ward and Turner¹³ in the United States, Buchanan⁴, Schuffner⁹ and Walch-Sorgdrager¹² in Europe, and Taylor and Goyle¹⁰ in India. Tiffany and Martorana¹¹ regard a titer of 1:1,000 or more as indicative of present or recent infection. With regard to the interpretation of positive reactions in low dilutions, a titer of 1:300 is regarded by many workers as evidence of present or past infection. A titer of 1:100 may also have some diagnostic significance, and should be interpreted in the light of other information. When found by an experienced technician, any titer, however low, merits investigation. Ward and Turner¹³ consider a titer of 1:10 as diagnostic when the antigen used has been recently isolated from infected hosts and is highly virulent.

According to information available to the writer, only a few surveys concerning the prevalence of human leptospirosis have been conducted in the United States. In recent years an extensive study was made by Ward and Turner¹³ on selected groups of persons in the city of Baltimore, Maryland. In an examination of 294 routine Wasserman sera, 3 per cent were positive for *L. icterohemorrhagiae*; in addition to other data given by these authors, of 75 poultry dressers, 48 meat packers, 24 candy makers and 146 university students, the per cent of infection was found to be 17.3, 63, 0, and 0, respectively. In a survey of leptospirosis in Los Angeles, California, Greene⁵ examined the sera of 426 persons, using *L. canicola* antigen, and in 339 of these sera, using *L. icterohemorrhagiae* antigen. None of the sera agglutinated the former antigen, whereas 4 agglutinated the latter antigen. A survey on leptospirosis conducted by Tiffany and Martorana¹¹ in New York City revealed that out of 1,351 individuals examined 10 were positive against *L. icterohemorrhagiae* antigen to a titer of 1:320 or more and 43 to a titer of 1:160 or less; these writers also found no reaction against *L. canicola* antigen in the sera from 59 persons whose occupation brought them into frequent contact with dogs.

The serologic study of 100 local dogs revealed that 39 per cent had passed through an attack of leptospirosis, possibly within recent years. Of these, about one-half showed infection with the classical strain and the other half with the *canicola* strain. From the standpoint of the significance of these findings, one is led to believe that transmission of infection from dogs to man may be anticipated. In the 344 human sera tested in this survey, one serum agglutinated *L. canicola*. Since this strain is not

known to occur in rats, the infection possibly originated from a canine source. Human infections with the *canicola* strain are apparently rare. Meyer and co-workers⁷ reported 2 cases in California and also cited 19 other cases reported by various workers in Europe.

The sera of 100 cats tested for the presence of agglutinins for the classical and *canicola* strains of leptospirae yielded negative results. These findings are possibly correlated with the low index of leptospiral infection among rats in Honolulu. According to Walch-Sorgdrager,¹² *L. icterohemorrhagiae* and *L. canicola* appear to be equally able to infect cats. Esseveld and Collier (cited by Greene⁵) report having found leptospirosis (Batavia type) among cats in Java, and infection of human beings there by this strain. In an examination of the sera of 100 cats by Greene⁵ in southern California, negative reactions were obtained against *L. canicola*; one serum diluted 1:90 caused aggregation of *L. icterohemorrhagiae*.

The incidence of rodent leptospirosis in various districts of Honolulu (table 2) varied from none to 8.0 per cent. The prevalence of this murine disease in the various districts is undoubtedly due to many factors, including amount of local rainfall, proximity to wet areas or streams, and abundance of Norway rats. Since the prevalence of this disease is known to be correlated largely with presence of surface water, it is of interest that examination of rats trapped along two fresh-water streams (Nuuanu and Kalihi) revealed 11.3 and 8.7 per cent infection, respectively. Of 21 rats trapped along Palolo stream, all were found free of infection. This, however, may be due to the apparent scarceness of Norway rats in that area. In this survey, of 15 rats which were found positive, 13 (86.6 per cent) were *norvegicus* species and 2 (13.3 per cent) of the *alexandrinus* species.

The finding of leptospirae in the kidneys of 4 out of 12 mongooses examined is considered of importance in the spread of this organism in nature. Many mongooses probably become infected as a result of eating rats, animals on which they commonly prey.

In addition to the above serological and tissue studies, leptospirae were isolated from local human, canine and murine sources. A human strain was isolated by inoculating the urine of a patient into young guinea pigs and then culturing pieces of infected kidney and liver of these animals in Verwoort's medium. The patient mentioned above had acquired leptospiral jaundice about two weeks fol-

lowing swimming in the Nuuanu stream (Honolulu), and was brought to the attention of the writers by Major R. J. Hoagland of the U. S. Army Medical Corps. The canine strain (*L. canicola*) was isolated through the use of culture methods from the kidneys of the two dogs (fig. 1, E) which had died of canicola fever and had been referred to the writers by Dr. L. C. Moss, local veterinarian. A murine strain was isolated as a result of inoculating young guinea pigs with kidney emulsion from infected rats trapped along the Nuuanu stream, and subsequently using culture methods.

From the foregoing it is evident that the control of leptospirosis rests largely on the following measures: (1) control of rats; these animals should be especially prevented from entering establishments where the floors are kept wet, such as basement

shower-rooms; (2) protection of feet by the use of boots or shoes whenever working in wet areas frequented by rats or dogs; (3) avoidance of swimming or wading in fresh water streams or ponds and avoidance of drinking from irrigation ditches frequented by rats; (4) proper veterinary care of sick dogs and cats; these animals should not be fondled, and contact with their urine should especially be avoided; and (5) active immunization of individuals in localities where exposure to infection exists, if such a measure is possible. According to Walch-Sorgdrager¹², immunization with vaccines containing killed leptospirae has been used on a large scale in Japan by various workers with apparently some success. In addition, the senior author² has successfully immunized dogs against leptospirosis by the use of 0.2 per cent formolized *Leptospira* antigen.

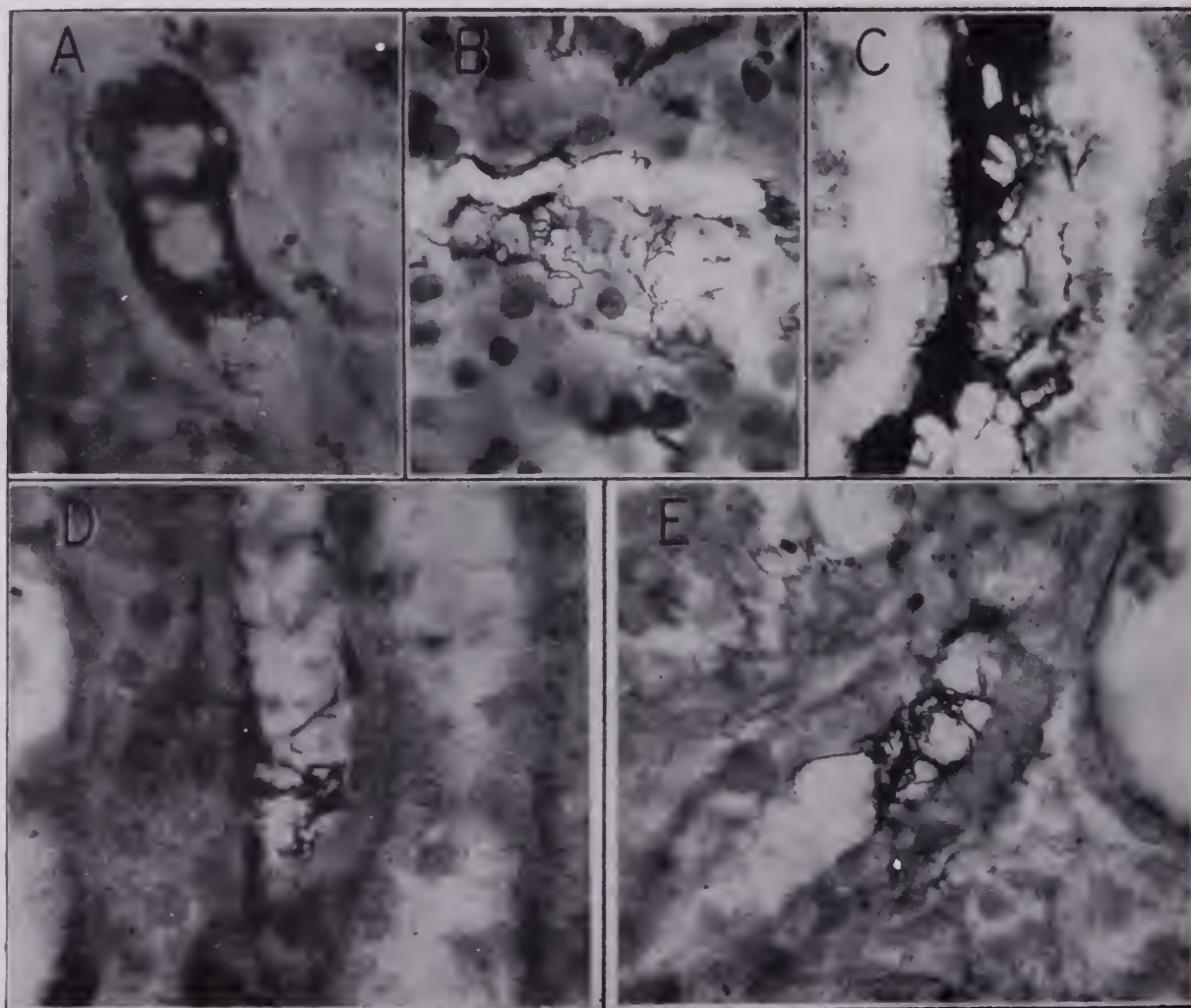


Fig. 1.—Sections of kidneys of rat (A, B, C), mongoose (D), and dog (E), showing leptospirae in the urinary tubules. Natural infections.

SUMMARY

1. During a six-year period, 1936 to 1942, 82 cases of human leptospirosis have been reported from five of the larger islands of the Hawaiian group.

2. The serum of each of 344 adult persons residing in Honolulu was subjected to microscopic agglutination test using freshly formolized *Leptospira icterohemorrhagiae* and *L. canicola* antigens. Of these, 6 sera agglutinated *L. icterohemorrhagiae* to a titer of 1:300 or more and 6 to a titer of 1:100. One serum agglutinated *L. canicola* antigen to a titer of 1:300.

3. Leptospiral agglutination tests conducted on the serum of 100 dogs revealed 20 positive for *L. icterohemorrhagiae* and 19 for *L. canicola*. Similar tests conducted on the serum of 100 cats gave negative reactions.

4. Of silver-stained sections of kidneys of 350 rats trapped in seven districts of Honolulu, 10 (2.9 per cent) exhibited leptospirae. Of 97 additional rats trapped along the banks of three fresh water streams in Honolulu, kidney sections of 8 (8.2 per cent) were found positive for leptospirae.

5. Of 12 mongooses trapped along the banks of Nuuanu stream 4 revealed leptospirae in sections of the kidneys.

6. *L. icterohemorrhagiae* was isolated by the use of animal inoculation and culture methods from urine of man and kidneys of rodents. *L. canicola* was isolated in Honolulu from the kidneys of two infected dogs.

7. Certain measures of controlling leptospirosis exist. The most important are rat control and protection of humans and dogs from infection.

APPENDIX A

Preparation of Vervoort's medium (Schuffner modification) as suggested by Meyer and co-workers⁷: To 1.5 liters tap water (free from chlorine) add 1.5 grams Witte peptone (Difco Proteose Peptone No. 3 is a good substitute). Dissolve by boiling and stirring. Add 6 cc. phosphate mixture from a stock

solution composed of 100 cc. distilled water, 0.35 gram potassium phosphate (monobasic) and 1.33 grams sodium phosphate (dibasic). Boil. Add 300 cc. Ringer's solution (composed of 300 cc. distilled water, 2.4 grams sodium chloride, 0.06 gram calcium chloride, 0.06 gram potassium chloride, and 0.06 gram sodium bicarbonate). Boil. Add 150 cc. Soorenson's buffer solution—pH 7.2. (In Honolulu, since tap water is alkaline, the writers have adjusted the pH to 6.8, i.e., mix 74.4 cc M/15 Na₂HPO₄ * with 75.6 cc M/15 KH₂PO₄ *). Boil until precipitation is complete (about 30 minutes). Cool in refrigerator overnight. Filter. Test pH which should be 6.8 to 7.2. Bottle. Autoclave at 15 lbs. for 15 minutes. Store in refrigerator until needed for use.

If the above medium is to be used for culturing leptospirae, 8 to 10 per cent sterile rabbit serum is added (the organisms grow better if a small amount of hemoglobin is present). This is tubed in 4 cc. amounts and inactivated for 30 minutes in a 56°C. water bath. Test for sterility.

APPENDIX B

Leptospira agglutination test:

Antigen: Use a four to six day old culture of *L. icterohemorrhagiae*, or *L. canicola*, depending on for what strain the serum is desired to be tested. Add 2 drops of full strength commercial formalin to each 10 cc. of culture. Set up 4 small test tubes in a rack. To each tube add Vervoort's medium without rabbit serum (buffer) and serum to be tested, as follows:

Buffer	1:2cc	0.9cc	0.9cc	0.9cc
Serum	0.3cc**	0.1cc**	0.1cc**	0.1cc**
Dilution	1:5	1:50	1:500	1:5,000

**Transfer 0.1 cc. from tube 1 to 2 and the same from 2 to 3 and 3 to 4.

Set up another 8 tubes in two rows and place in each the above dilutions and the formolized leptospira antigen as in model below:

Incubate the tubes for 3 to 4 hours at 37°C. and examine darkfield preparations for clumping; this may be done by taking up a drop of the media with a wire loop, placing on a glass slide with or without a cover slip and examining with a low or medium power objective. Definite clumping of the leptospirae, usually appearing as large tangled masses in a clear medium are read ++++; proportionally less clumping are read ++, +, and +, respectively.

Row 1		Row 2		Control	
0.15 cc.	1:5, plus	0.05 cc.	1:5, plus	0.15 cc.	buffer, plus
0.15 cc.	antigen	0.10 cc.	buffer, plus	0.15 cc.	antigen
	(1:10)	0.15 cc.	antigen		
			(1:30)		
0.15 cc.	1:50, plus	0.05 cc.	1:50, plus		
0.15 cc.	antigen	0.10 cc.	buffer, plus		
	(1:100)	0.15 cc.	antigen		
			(1:300)		
0:15 cc.	1:500, plus	0.05 cc.	1:500, plus		
0:15 cc.	antigen	0.10 cc.	buffer, plus		
	(1:1,000)	0.15 cc.	antigen		
			(1:3,000)		
0.15 cc.	1:5,000, plus	0.05 cc.	1:5,000, plus		
0.15 cc.	antigen	0.10 cc.	buffer, plus		
	(1:10,000)	0.15 cc.	antigen		
			(1:30,000)		
		0.05 cc.	1:5,000, plus		
		0.10 cc.	buffer, plus		
		0.15 cc.	antigen		
			(1:30,000)		

APPENDIX C

Silver impregnation method for the demonstration of leptospirae in tissues:

1. Blocks of tissues about 4 mm. thick are fixed in 10 per cent formalin in distilled water for several days or weeks, preferably three months.
2. Transfer to absolute alcohol for 24 hours.
3. Pass through various grades of alcohol, 90, 70, 50, 30, 1 hour each. (The tissue may be stored in 70 per cent alcohol for a few days, if desired.)
4. Wash in distilled water, three times, 20 minutes each.
5. Transfer to 1 per cent fresh silver nitrate solution in distilled water for 22 to 24 hours at 37 C. in the dark.
6. Wash in distilled water 3 times, 10 minutes each.
7. Transfer to 1 per cent hydroquinone in 50 per cent alcohol in lighted area at room temperature, 24 hours.
8. Pass through various grades of alcohol, 70, 90, 95, one hour each. Absolute alcohol, 3 hours.
9. Place in toluol, 15 minutes.
10. Transfer in cedarwood oil, 12 hours or more.
11. Wash in benzol, 15 minutes.
12. Transfer to soft paraffin, 15 minutes. and hard paraffin, 30 minutes, 56° C.
13. Imbed in paraffin or tissue mat; block and prepare thin sections (8-10 microns); mount and dry sections; remove paraffin in xylol and mount in balsam.

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University of Hawaii.

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Treatment of Bronchiectasis: I

DISCUSSION AND REPORT OF A CASE

S. E. DOOLITTLE, M.D.

Honolulu

The following case of chronic bronchiectasis is of interest because it has been followed from early infancy to a surgical "cure."

CASE REPORT

G. A. has been under the care of The Clinic physicians since her birth in August 1927. Her first recorded illness was at the age of 3 months, when she had acute rhinitis, and "bubbling rales" were heard over both lung fields. At 11 months she had an illness in which her mother remembers she "slept for five days and nights." Two months later she was treated for "capillary bronchitis." Within the next six months she suffered from several diffuse respiratory tract infections, one of which accompanied by otitis media. An adenotomy was performed shortly after this. At 1½ years she had pertussis and three months later had recurring bronchitis with fever. During the next year she had at least two more attacks of bronchitis. Before her fourth birthday her tonsils were removed and immediately following this she developed measles of moderate severity. No illness is recorded or remembered by the mother for the next two years.

In June, 1933 (at the age of 5½ years), the patient had a serious pulmonary illness with chills and fever, chest pain, bilateral rales, albuminuria, cylindruria and cough, with sputum showing diplococci as the predominating organism. The first chest roentgenogram, taken on June 10, 1933, showed a right lower lobe bronchopneumonia and a triangular density in the left base behind the heart shadow. There was a small patch of exudate just lateral to the apex of the heart.

In September, 1933, the lower right lobe pneumonia had entirely cleared and the shadows just above the diaphragm outside the apex of the heart were more linear in appearance. The heavy triangular postcardiac density on the left persisted unchanged. This was interpreted as chronic bronchiectasis with associated atelectasis of the lower lobe. Cough and sputum and left basal rales persisted. The patient was admitted to the Leahi Hospital on February 7, 1934, and remained there until April 28, 1934. Sputum examinations were negative for tubercle bacilli and tuberculin tests up to 1 mgm. of old tuberculin were negative. She gained considerable weight and improved symptomatically with routine sanatorium care and postural drainage.

In October 1936, at 8 years of age, she suffered another attack of bronchopneumonia and was readmitted to the sanatorium for care. She remained there for about three months and again made considerable general improvement. Sputum was reduced from 450 cc. a day to about 10 cc. All tests were again negative for tuberculosis. Roentgenograms taken on November 4 shortly before admission showed very little change from previous chest roentgenograms.

During 1937 and afterward she continued with good home care. Schooling, social intercourse and physical development were retarded by frequently recurring bouts of fever and by chronic cough. The cough was severe, worse at night, productive of abundant purulent (but never fetid) sputum. Drainage was assisted by placing the head and thorax in a dependent position night and morning. About half a cup of sputum was usually expectorated twice daily by this maneuver. Twice during the past two



Fig. 1. Chest roentgenogram, Sept. 4, 1933. Note postcardiac triangular shadow of collapsed left lower lobe.



Fig. 2. Chest roentgenogram, June 9, 1942. Bronchogram, with lipiodol filling of saccular bronchiectatic cavities in the lower lobe.

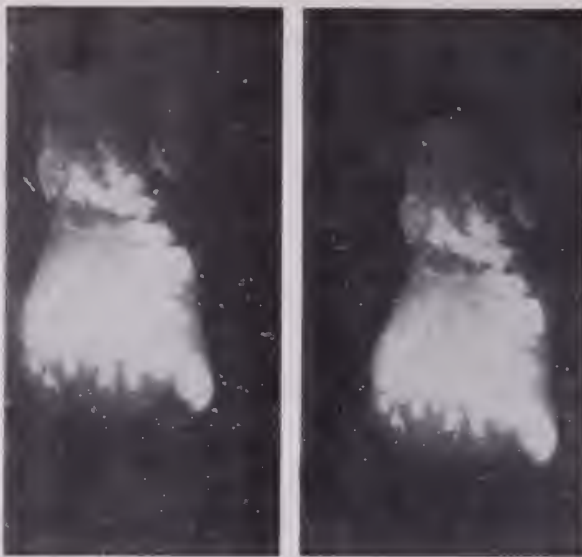


Fig. 3. Surgical specimen: removed left lower lobe, showing lipiodol-filled bronchi.

years the sputum has been blood tinged (pinkish). Recent administration of sulfathiazole effected slight improvement in the character of sputum and its ease of expectoration and lessened night cough, but gave no permanent benefit.

Examination in July 1942 showed a girl of 15, retarded in development and growth. She exhibited pallor, curved nails, restricted motion of the left chest and slight dullness over the left base posteriorly and bilateral sibilant rales with moderately coarse to bubbling rales in the left base posteriorly. Roentgenograms showed the persistence of an atelectatic left lower lobe. There were more strands and oval densities just above the left diaphragm (which was elevated). Bronchograms and studies in several positions established the presence of a well marked sacular bronchiectasis in the atelectatic left lower lobe. Other major bronchi were free with the exception of a small amount of dilatation of bronchi to the lingula of the left upper lobe.

COMMENT

Diagnosis: The case presents a typical picture of chronic bronchiectasis. The diagnosis is, of course, based finally upon the roentgenographic demonstration of characteristic bronchial dilatation by lipiodol visualization. The history of frequently recurring attacks of respiratory illness from early childhood, bouts of fever (bronchopneumonia), persistent basal rales, and chronic cough with abundant expectoration is of course highly suggestive. The diagnosis was first made on the basis of flat posterior-anterior chest roentgenograms. The basilar triangular shadow has been elucidated as a sign of bronchiectasis and associated atelectasis of a lower lobe a number of times since it was reported in this country by Singer and Graham in 1926.¹⁻²

Etiology: It was hoped that we might find a definite clue to the etiology of the atelectasis and



Fig. 4. Chest roentgenogram, Oct. 16, 1942, three months after operation.

bronchiectasis by a careful review of the history. The clues were unfortunately too numerous and chest roentgenograms taken too late to find the original cause.

A respiratory infection with rales occurred at 3 months of age. The child was considered to be well until 11 months. She then had a serious illness, when she slept for five days and five nights. This might have been encephalitis, or only an unusually toxic pneumonia. In either case, bronchial obstruction may have occurred at the time due to inspired mucus, glandular enlargement, or actual inflammatory changes in the bronchial tube. Within two months the child suffered from capillary bronchitis, and respiratory infections were more frequent from that time on. Pertussis and measles occurred before the fourth year, and both have been mentioned as frequent precursors of bronchiectasis. The first roentgenogram, taken at 6 years of age, demonstrated the atelectasis of the left lower lobe with unquestionable accompanying bronchiectasis. Bronchopneumonia was present in the opposite lung at this time. It is believed that this was an aspiration pneumonia from a previously existing bronchiectasis.

This case is a good example of a group of cases, found most frequently in childhood (the left lung is more frequently involved than the right one, as in this case), in which proof remains that atelectasis, undoubtedly due to bronchostenosis, is the cause of bronchiectasis. Congenital bronchiectasis may occur but is considered rare by most writers.³⁻⁴ Bronchial obstruction is usually acquired and may be either permanent or temporary. Permanent causes are new growth, inflammatory thickening or narrowing. Temporary causes may be foreign body, inspissated

secretion or glandular enlargement. Changes in the relationship between the negative intrapleural and positive bronchial pressure are produced by resulting lung collapse. The resulting increased pull on the bronchial walls is believed to be a more important cause than the increase in bronchial pressure by inspiratory effect or by forceful, continued or paroxysmal cough. The part played by bronchial infection in the fundamental etiology of bronchiectasis is considered of less importance than formerly. That infection (pneumococcic, streptococcic, Vincent's or non-specific) may weaken bronchial walls, by destruction of supporting muscle and elastic tissue, cannot be denied; it seems highly probable, however, that such chronic infection becomes a much more important factor when there is partial or complete obstruction and inadequate drainage. Infection is of great importance as a cause of frequent complications of the disease; namely, contiguous bronchopneumonia, aspiration pneumonia, pleurisy, pulmonary gangrene, pulmonary hemorrhage, and metastatic abscesses.

Indications for Surgery: The serious aspects of chronic suppurative pulmonary disease were sufficiently pronounced in this case to make us feel that surgical treatment offered the only hope for restoration to normal life. The child was stunted in physical and mental development because of chronic recurring bouts of fever (pneumonia), chronic cough and sputum, and so on. Medical treatment (sanatorium care, excellent home care, long-continued postural drainage, sulfonamide therapy) had been adequately tried. Continuation of this program seemed certain to accomplish nothing more, since the atelectasis did not change and the bronchiectatic cavities were far too large and heavily infected to

be expected to decrease in any period of treatment. Upon the establishment of the fact that the other lung was not seriously affected and that the patient was a reasonably good operative risk, surgery was advised. We were influenced further in this opinion by recently published statistics showing the high fatality rates of medically treated cases of bronchiectasis. Perry and King⁵, in a follow-up study of 211 cases not treated surgically, found that 66 were dead—a mortality of 31 per cent. Bradshaw, Putney and Clerf⁶, in a study of 171 cases of untreated bronchiectasis diagnosed between 1925 and 1935, found a mortality rate of 34.5 per cent. These statistics, showing a mortality rate some 3 to 6 times that of surgical treatment, indicate a new responsibility for the physician: to consider operative treatment within a reasonable interval following the first diagnosis of unilateral bronchiectasis.

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881 Young St.

Treatment of Bronchiectasis: II

REVIEW OF THE LITERATURE AND DISCUSSION OF SURGICAL TECHNIQUE

J. E. STRODE, M.D.

Honolulu

The treatment of bronchiectasis, like the treatment of other surgical lesions of the chest, has made tremendous strides in the past decade. The ability to make a correct diagnosis and particularly the ability to define the segment of the lung involved, coupled with improved surgical technique, has moved bronchiectasis from the category of diseases in which only palliation could be hoped for, to one in which cure can be expected in a high percentage of cases.

There is only one cure for bronchiectasis: removal of the part of the lung that is involved. Fortunately the condition is usually limited to one or both lower lobes, with or without involvement of the middle lobe on the right or the lingula of the upper lobe on the left. That an individual can live comfortably when a large part of the lung tissue has been removed is well known from reports by various men interested in the subject. Overholt¹ in 1937 reported the removal of both lower lobes and the right middle lobe in four stages from a girl 19 years of age. Eight months later the vital capacity was 1162 cc. Graham² in 1940 reported the successful removal of all pulmonary tissue except the two upper lobes. Several months after operation the vital capacity was 1200 cc., and there was no dyspnea on ordinary exertion.

In passing it might be mentioned, largely because of historical interest and not because of practical value, that many surgical methods have been used in treating bronchiectasis. Pneumothorax, oleothorax, plombage, thoracoplasty, phrenectomy, ligation of branches of the pulmonary artery, pneumotomy and cautery pneumonectomy have all had their advocates.

Hiddenham in 1901 is credited with the first successful lobectomy in man. In 1932 Graham, Singer and Ballon collected 212 cases of lobectomy with a mortality of 34 per cent and a complete recovery of only 47 per cent. In 1939 Tudor Edwards reported 166 lobectomies with a 12 per cent mortality, with only 2 deaths in his last 54 cases. Churchill has reported 84 cases with 4.7 per cent mortality and Graham, Obrien and others have recently reported mortalities around 5 per cent. Thus

it is seen that the treatment of bronchiectasis in competent hands can be as safe as the majority of the more serious abdominal operations.

INDICATIONS FOR LOBECTOMY

The justification for recommending lobectomy for bronchiectasis lies in the fact that the disease is usually a progressive one, or at least once established does not improve, and eventually is fatal in a large proportion of the cases. Frequent episodes of bronchopneumonia, the result of the lung's continuously harboring infected material; hemorrhage, brain abscess and amyloid degeneration of internal organs are the more important of the common complications of this disease. Even were it not for these, the mental relief obtained by freeing the individual from daily coughing up a large amount of foul-smelling sputum would be indication enough.

Tudor Edwards, in regard to selecting cases for operation, says that in general the patient should be between the ages of 4 and 40, the bronchiectasis reasonably localized and infected, and no serious general contra-indications present. Blades says it is more important to define the contra-indications than the indications. Patients beyond middle life are in general not suitable, while children, on the other hand, tolerate intrathoracic operations particularly well. Cardiovascular disease and recent pulmonary infection are contra-indications.

PREPARATION FOR OPERATION

In the preoperative preparation of the patient the same general rules hold as for operations of similar severity elsewhere. In addition there are special precautions to be used. Postural drainage should be instituted for several days in order to free the lung of as much infected material as possible. Elevation of the foot of the bed 12 to 18 inches (30 to 50 cm.) with boards under the mattress, serves the purpose well. Some men believe that bronchoscopic drainage for several days preoperatively is a more effective method. Nasal sinus disease is frequently associated with, if not a direct factor in the causation of, bronchiectasis. Most observers agree that such infections should be cleared up as adequately as possible before attempting any direct attack on the lung itself.

Read before the staff meeting of The Clinic, October, 1942.

Artificial pneumothorax on the side to be operated upon has its advocates, but seems to be losing favor in the eyes of most thoracic surgeons. It was previously done to accustom the organs in the thoracic cage to the changed physiologic conditions brought about when the thorax is opened. The use of pressure anesthesia seems to have largely eliminated the necessity for this precaution.

TECHNIQUE OF LOBECTOMY

The answer to the question of whether to do lobectomies in one or two stages has not been universally agreed upon, though the one-stage procedure seems to be in the ascendancy at the moment. Stabilization of the unaffected lung by adhesions to the chest wall, which in turn helps stabilize the mediastinum and diminishes cardiovascular respiratory changes when the pleura is opened, constitutes the chief reason for the two-stage procedure. There is also the hope for a more limited pleural involvement in case of infection.

It might be well at this point to re-emphasize the fact that an exact localization of the diseased lung to be removed must be made by preoperative bronchograms, and not at the time of the operation by the appearance or consistency of the lung tissue. Shenstone has this to say: "The extent of bronchiectasis cannot be recognized by an examination of the lung itself after the chest has been opened; it is therefore essential that this be definitely ascertained before surgery is considered. The only known way by which such exact information can be obtained is by the thorough visualization of the whole bronchial tree of both lungs with iodized oil and a careful study of radiographic films made in the lateral as well as the anterior-posterior direction."

Meyers and Blades found in 57 per cent of their cases with left lower lobe bronchiectasis that the lingula of the left upper lobe was also involved, and when the right lower lobe was the seat of trouble the right middle lobe was also involved in 59 per cent of the cases. Churchill has found the lingula involved in 80 per cent of his cases with left lower lobe bronchiectasis.

Since it is necessary to remove all of the lung involved in the bronchiectatic process to obtain a complete cure, it is essential that all of the bronchi be satisfactorily visualized preoperatively. This may be done by filling the various bronchi with iodized oil under direct visualization with the bronroscope, or by other methods, such as Singer's, the technique of which has been described elsewhere. It is important to take not only anterior, posterior and lateral roentgenograms, but oblique views also, in order to

show the right middle lobe and the lingula of the left upper lobe. Pierce and Stocking have demonstrated the great value of oblique projection of the thorax in studying the bronchial tree.

The anesthesia to be used varies with the individual experience of the operator, though most favor cyclopropane. The intratrachea route permits frequent aspirations of the trachea, an aid in preventing aspiration pneumonia when much secretion is present. A closely fitting facial mask which permits the anesthesia to be given under pressure may serve equally well.

The incision for lobectomy is usually made on the posterior-lateral side of the chest wall, either resecting one rib (sixth or seventh) or by an incision in either the sixth or seventh interspace with severing of the rib above and below posteriorly near the border of the erector spinae muscle. Such an incision gives an adequate exposure of the entire lung and permits one to deal with any lobe involved.

In dealing with the hilum of the lung opinion differs as to the advisability of ligating the vessels and bronchi en masse or individually. The cases of lobectomy and pneumonectomy which we have done have been accomplished by individual ligation of the structures of the hilum, though the Shenstone apparatus for mass ligation was available. A curved gallbladder clamp has been a satisfactory instrument to use in teasing the structures apart to permit insertion of the ligatures.

In helping to prevent the opening of the bronchus postoperatively it would seem advisable, when possible, to close it over with mediastinal pleura or adjacent lung tissue. Re-opening of the bronchus is a more serious complication if it occurs early, than if it occurs late.

Drainage of the chest following lobectomy for bronchiectasis seems to be a fairly universal custom, in contrast to pneumonectomy, where the opposite practice is usual. Introducing a large Foley catheter in the lowest available intercostal space in the mid or anterior axillary space serves the purpose well. Insertion of such a catheter, connected with a water seal beneath the bed at least 2 feet (60 cm.) below its entrance into the chest, is a good method of procedure. Drainage of the pleura prevents tension pneumothorax and allows the escape of exudate, but probably predisposes to the formation of an empyema.

Empyema complicates the postoperative recovery of a fairly high percentage of these patients. In the treatment of this complication, early and adequate drainage of the pleural cavity is necessary. Chemo-

therapy has not been credited with startling results in the treatment of this complication, and I have seen no report of the effectiveness of the local application of sulfonamides in its prevention, though this should theoretically be of value. Individual ligation of each structure in the hilum apparently is followed less often by empyemas than is mass ligation, because a more efficient closure of the bronchi can be carried out.

On return from the operating room the patient should be placed in an oxygen tent. He should be carefully watched for symptoms of shock, and if any doubt exists as to this possibility, blood transfusion is indicated.

CASE REPORT (Continued)

The patient whose case history Dr. Doolittle presented was operated upon on July 17, 1942, under intratracheal cyclopropane anesthesia. Operation was preceded by several days of postural drainage and vitamin administration. The incision was in the posterior lateral aspect of the chest over the seventh rib, which was resected. The lower left lobe was removed without difficulty and the vessels and bronchi were ligated individually. Five or 6 grams of sulfanilamide were dusted over the hilar stump and into the pleural cavity. Mediastinal pleura and the remaining lung tissue were used in covering over the ligated vessels and bronchi. A No. 22 Foley catheter was introduced into the pleural cavity in the ninth intercostal space in the anterior axillary line and was connected with a water seal beneath the bed. It was removed on the third postoperative day. Fluid was subsequently aspirated from the chest but it remained sterile. The patient made a good recovery.

SUMMARY

A case of chronic bronchiectasis followed from early infancy to surgical "cure" has been presented.

No specific etiology was demonstrated by careful study of the history but it is apparent that broncho-stenosis and atelectasis occurred early.

Modern views of etiology and treatment have been reviewed and the reasons for consideration of surgical therapy suggested.

Surgical technique has been discussed in some detail.

CONCLUSIONS

1. Bronchiectasis is a curable disease when its extent is limited.
2. Surgical removal of the diseased lung is the only hope for cure.
3. Complete bronchographic study is necessary to establish the diagnosis and the extent of disease in the selection of patients for surgical treatment.

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881 Young St.

Social Aspects of Maternity Care

A STUDY OF 203 CASES UNDER CARE AT THE QUEEN'S HOSPITAL

VIRGINIA CHATFIELD OTT, A.B., M.S.*

Honolulu

This study was undertaken to determine whether social problems materially affect the physical course of pregnancy and delivery, and whether a medical-social worker can through constructive assistance contribute appreciably to routine medical care. Three additional questions arose:

1. What specific social problems confront pregnant women and how often do these occur?
2. What additional problems confront unmarried mothers, and are others intensified?
3. Are these social problems or their relative frequency related to racial inter-mixtures?

SELECTION AND METHOD

The patients studied in this report comprised 203 mothers under maternal health care at The Queen's Hospital from 7-15-41 to 1-15-42. Fifty-four of these attended the prenatal clinic conducted by the Board of Health located at the hospital, while the remaining 149 were admitted directly to Queen's, some having attended other clinics and others having gone to private doctors for ante partum care. This study includes all City and County, staff and those few private patients referred for specific reasons.

ECONOMIC STATUS

Of the total, 39 per cent of the mothers were unable to pay for any part of their maternity care, 61 per cent paid for some or all of their medical treatment.

AGE

The youngest mother was 13 and the oldest 45 years.

REQUESTS FOR SERVICE

Requests for case work service came from doctors, nurses, and patients themselves; the social worker on rounds occasionally observed problems.

Some of the difficulties found, such as, finding someone to care for children at home during the mother's confinement, or facilitating hospital arrangements, were tangible and fairly simple to solve. Others were more intangible, yet vitally im-

portant to the patient. For example, helping an unmarried mother work through conflicting emotions regarding her pregnancy and her feeling toward the baby's father, and making plans for future care of the baby and for her continued existence as a useful member of the community.

<i>Services Requested</i>	<i>Cases</i>
Arrangements for convalescent care.....	171
Reassurance & interpretation to patient regarding medical treatment.....	126
Arrangements for completion of medical recommendations	125
Discussion of birth control measures.....	114
Financial arrangements for hospitalization.....	101
Cooperative management of case with public health nurse	78
Miscellaneous—as discussing preparation of other children for arrival of this infant; discussion of racial prejudice; reassurance to mothers regarding war conditions, etc.....	59
Discussion of marital problems.....	37
Referrals to other agencies for financial help.....	36
Adoption plans (32% of pregnancies, illegitimate).....	17
TOTAL	864

TOTAL—exceeds the total number of patients, as some situations presented more than one aspect needing case work service. Of the 17 cases in which adoption was a part of case work treatment, 6 were handled through child placing agencies; in 11 cases adoption procedure was considered but not followed. Of these 11, 8 mothers decided to keep their infants, 2 made their own arrangements with friends for adoption and one infant died.

DURATION OF SOCIAL SERVICE CONTACT

Social Service contact varied from a single interview (case 1), to contacts extending over fourteen months in one instance (case 2).

CASE 1.—Mrs. C, Chinese, gravida 3, married to a Caucasian sailor, had a normal delivery; the baby, however, had club feet and further medical care for the infant was indicated. In a single interview, plans for future medical care for the baby through the Bureau of Crippled Children were worked out. Satisfactory arrangements for convalescence were made, and the public health nurse was notified of medical recommendations.

CASE 2.—In the second month of pregnancy, A. B., a 26 year old unmarried Caucasian girl, was referred by her private doctor who felt that the numerous social problems complicating her otherwise normal physical condition could best be handled by a medical social worker.

This intelligent, well-educated girl came to the islands for a vacation but remained after finding a secretarial position. She was an attractive person and had a busy social life. She became acquainted and fell in love with a tourist; when she found the*

*Senior medical social worker of staff of the Social Service Department of The Queen's Hospital.

CHART A. Maternal and Paternal Nationality Showing Racial Amalgamation

PATERNAL RACIAL STOCK (PURE)											MATERNAL RACIAL STOCK (MIXED)																								
1	2	3	4	5	6	7	8	9	TOTAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22				
1	7	5	4	1	5	3	1	1	27	5	7	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19				
2	8	3	3	1	1	1	1	1	15	3	2	1		1	1																9				
3	1	9	1	1	1	1			13	1																					2				
4			6						6	2	2	2																			9				
5	5		1	10					11																						0				
6						2	1		3	1	1																				2				
7			2	2	2	2	14	1	21	2	3	2				3										1					11				
8								3	3																						0				
9				3		2			5	1	1					1																4			
10									0																		1					1			
11									0																							1			
TOTAL (Pure)										7	14	16	15	19	10	15	7	1	104	14	16	2	5	2	2	4	1	0	1	1	1	1	1	1	157
PATERNAL RACIAL STOCK (MIXED)																																			
1		1				1			2	1	1																				2				
2				4	1				5	1	7																				8				
3									0	2																					2				
4									3	1																					2				
5		2	1						1																						3				
6		1							1																						3				
7		1							1	1	2	1																			0				
8					1				1																						1				
9									1																						1				
10									1																						1				
11									1																						1				
12									1																						1				
13									1																						1				
14									0																						1				
15									0																						1				
TOTAL (Mixed)										5	2	5	3	1	1	1	0	0	17	9	9	2	0	1	0	0	0	0	1	0	0	1	0	0	25

† (Pure stock now is rare even on other islands, so that some included in this number are probably not although the individuals claim they are)

CHART B. Showing Illegitimacy According to Nationality

PATERNAL RACIAL STOCK (PURE)												MATERNAL RACIAL STOCK (MIXED)												TOTAL												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22															
1	Caucasian	2	3	2	1	3	2	1	1	1	15	1	4	1	2	1	1	1	1	1	1	11														
2	Portuguese			2					1		3											0														
3	Japanese				1	1					2										1															
4	Hawaiian				1						1	1							1			1														
5	Porto Rican					1					1										3															
6	Chinese										0										0															
7	Filipino					2		2			4	1	1	1		2					6															
8	Korean										0										0															
9	Unknown						1				4	1				1				1	3															
10	Italian										0						1				1															
11	Marshall Islander										0										0															
TOTAL (Pure)												2	3	4	6	7	3	3	2	0	30	3	7	1	2	2	1	3	1	0	1	0	1	1	0	25
PATERNAL RACIAL STOCK (MIXED)												MATERNAL RACIAL STOCK (MIXED)												TOTAL												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22															
1	Chinese-Haw'n.										0	1	1								2															
2	Cauc-Haw'n.										2		1								1															
3	Ch.-Cauc.-Haw'n.										0	1									1															
4	Port.-Haw'n.										2										0															
5	Port.-Haw'n.-Cauc										2										0															
6	Port.-Cauc										0		1								1															
7	Port.-Fil.										1										1															
8	Port.-P. R.																				0															
9	Fil.-P. R.																				0															
10	P. R.-Haw'n.																				0															
11	Haw'n.-Spanish																				0															
12	Ch.-Cauc.																				0															
13	Fil.-Port.-Haw'n.																				0															
14	Fil.-Port.-Sp.																				0															
15	P. R.-Ch.-Haw'n.																				0															
TOTAL												2	3	4	6	7	3	3	2	0	30	3	7	1	2	2	1	3	1	0	1	0	1	1	0	25

† (Pure stock now is rare even on other islands, so that some included in this number are probably not although the individuals claim they are)

she was pregnant, she became extremely emotional. Above all, she did not want her family to learn of her pregnancy. The alleged father returned to the Coast and his whereabouts were unknown. The girl was faced with the prospect of going through pregnancy alone as well as making future plans for herself and the baby. Gradually, she was able to face the reality of having a child and her decision from this point on was to keep her infant, refusing even to consider adoption.

Continued support was given by frequent interviews for discussion of medical recommendations, course of pregnancy or whatever the girl herself wished to talk about. Grant of an endowed bed made possibly delivery by a private doctor; financial assistance was secured through a private family agency. This patient was a normal, healthy individual who had a normal physical course of pregnancy. Whether the release of emotional tension and anxiety, and encouragement to face reality, facilitated this, is unknown.

To bring into clearer focus the relationship between the social and emotional factors in the course of pregnancy, and the effect of continued medical social case work contact during ante and post partum care, the 54 cases referred by the prenatal clinic were analyzed in detail. The average number of interviews from initial clinic appointment through hospital delivery to post partum examination in the clinic was 9.4. The social worker had continued contact with these 54 mothers over an average clinic attendance period of 3.4 months. In this interval social treatment alleviated some of the adverse factors in varying degrees. In one case, both medical and social aspects complicated pregnancy:

CASE 3.—A 42 year old Chinese-Hawaiian mother had had hospitalizations for treatment of cancer of the breast, and, because of her past hospital experiences, was afraid, refusing to consider clinic care or hospital delivery. The medical social worker, having had a satisfactory contact with this patient in the past, interviewed her at home, and was able through explanation and reassurance to get her to accept clinic care; her physical condition was poor and her attendance erratic. However, she agreed to hospitalization; fortunately, these plans were completed in time to admit her because of premature labor. Meanwhile, post partum care was arranged at the City and County convalescent home as the patient's own home was totally inadequate for convalescence. Plans for the infant were worked out jointly by the medical social worker and the relief agency worker who was active concurrently on the case.

RACES OF PARENTS (Chart A)

Parental racial stocks show the amalgamation of races for which Hawaii is famed. About one-half of the total fathers were of the same nationality as that of the mothers; 25 different paternal nationalities are represented, including 9 unmixed stocks and 15 mixtures, (i.e., of two or more racial stocks); maternal racial stocks show 9 pure and 23 mixtures.

Of the 203 mothers, 104 were of pure stock; 57 of this number had spouses of their own racial stock.

There was no marriage of Caucasian women other than with Caucasian men. On the other hand, Caucasian men married women of various racial backgrounds. Chinese and Japanese unions were very limited although the number of Chinese-Hawaiian and Chinese-Caucasian was high. Japanese tend to marry with less frequency into other races than any other group included in this study.

ILLEGITIMACY (Chart B)

Sixty-six, or about one-third, of all the pregnancies were illegitimate. Of this number 48 per cent were in Hawaiian or part-Hawaiian mothers, for whom the social stigma is less acute because of their cultural background. Of the 66 illegitimate pregnancies, 35 of the mothers were of pure stock (i.e. not of mixed racial background). Of this number only 5 became pregnant by men of pure stock. There were 31 illegitimate pregnant mothers of mixed nationalities. In only 2 cases were the fathers of the same mixture (Caucasian-Hawaiian); 11 became pregnant by Caucasian men; 6 became pregnant by Filipino men, which was the next largest group.

LENGTH OF HOSPITAL STAY

Length of hospitalization varied from twenty-four hours to twenty-eight days. The average number of hospital days was 6.6 for this group. Occasionally, physical complications appear later than the forty-eight hours or more after delivery, which is as long as City and County patients usually remain in the hospital. A case in point follows:

CASE 4.—Mrs. H., a 25 year old Hawaiian-Caucasian, gravida 5, had a normal delivery of twins; they were premature and hence remained in the nursery after the patient's two-day period was ended. Her condition at the time of discharge was normal; however, on her fourth post-partum day, bleeding began when the husband gave the patient a cathartic. Readmission was immediately necessary as were blood transfusion and an additional eight days' hospitalization. Possibly, had she remained in longer following delivery, the second hospital admission might have been avoided.

EFFECT OF WAR CONDITIONS

Although much of this case material was compiled before December 7, there are a few indications of the effect of war conditions on mothers and on maternity care. There has been an increase in the number of hospital deliveries. Blackout and curfew restrictions have limited midwifery, making home deliveries difficult; increased incomes occasioned by war jobs have made more hospital deliveries possible. Obstetricians had expected a sudden increase in abortions and premature labors following the "blitz," but complications seemed to be the exception rather than the rule. The social worker has

observed behavior in small children which seems to reflect much of the parental attitude toward the war. A case in point follows:

CASE 5.—A 28 year old Portuguese mother who has one child aged 2, is near term in her second pregnancy. The child is bright, attractive and demanding attention. Since the onset of the war he has been enuretic, refuses to be left out of his mother's sight and insists on being carried. The mother is a rather immature, emotionally unstable person who has limited understanding of the relationship between her own anxieties in regard to war conditions and her own physical status, and the behavior of her child. In regular contacts with this woman, the medical social worker has tried to give her additional understanding of the cause of the boy's behavior and methods of coping with it. Reassurance and continued help have been prime components in dealing with this situation. Referral to a private family agency for more intensive treatment of the child's behavior problems is pending.

SUMMARY

Medical Factors

Data show that 25 per cent of these 203 mothers had insufficient prenatal care, 10 per cent having had no medical attention until admitted for delivery.

On basis of case material, it is questioned whether forty-eight hours' hospitalization provided for those mothers unable to pay for their own care is adequate.

More than one-half of mothers did not have post partum examinations.

There did not seem to be any direct relationship between employment and the course of pregnancy.

Despite these factors, normal pregnancies far exceeded those with complications.

Social Factors

A wide range of social problems are evidenced:

(1) Difficulty in carrying out medical recommendations. (2) Financial worries. (3) Influence of war conditions. (4) Problems arising out of illegitimacy, rejection of infant, need for adoption. (5) Marital difficulties.

Among unmarried mothers, disturbing factors most frequently observed include emotional and financial insecurity, apprehension, uncertainty; often intellectual and emotional rejection of pregnancy, resulting in inability to make plans for themselves or their infants.

The active racial amalgamation which is obviously going on in the Territory does not seem to influence these pregnancies unfavorably.

Nearly one third of the pregnancies were illegitimate. The explanation for the large number of local unmarried mothers lies in (1) Cultural and economic factors; (2) Preponderance of male population due to increased numbers of service men and war workers; (3) Ignorance of birth control measures; and (4) Selection of the group under study.

CONCLUSIONS

(1) Utilization of medical social service early in pregnancy can do much to mitigate the effect of adverse social factors.

(2) Unmarried mothers as a group are more acutely in need of social service assistance than married mothers; early and sustained treatment is essential to a favorable social prognosis.

(3) The value of social service in routine maternity care lies in early treatment of the individual patient's problems. Medical treatment becomes more effective when anxiety, worry and tension are lessened.

Corpus Luteum Cyst in Ovarian Transplant

LYLE G. PHILLIPS, M.D.

Honolulu

That ovarian transplants not only do function but are sometimes the site of pathology frequently found in normal ovaries is indicated by the following case history:

On April 11, 1941, at Kapiolani Hospital, Mrs. R. R. P. was operated upon because of symptoms and physical findings indicating a chronic inflammatory process involving her pelvic organs. She had previously had a pelvic laparotomy for pelvic inflammatory disease, at which her right ovary, tube, and appendix were removed. At operation the left adnexae were found to be involved in an inflammatory mass consisting of an ovarian cyst about six cm. in diameter and a greatly thickened pyosalpinx. Subtotal hysterectomy and left salpingo-oophorectomy were performed. The ovarian mass was immediately carefully examined and several small fragments of fairly normal appearing ovarian tissue were recovered. These were transplanted into the recti muscles.

Moderate hot flushes and other menopausal manifestations were noted by the patient for about two months after operation and were easily controlled by Stilbestrol.

Occasional vaginal smears during the year following operation showed cells indicative of adequate estrogenic function.

On June 26, 1942, after using a heavy vacuum cleaner, the patient noticed a painful swelling about one inch to the right of her abdominal incision. On examination a firm, tender mass about one inch in

diameter could be palpated in the abdominal wall. Development of a cyst in an ovarian fragment was considered, but because of the sudden onset and pain an incisional hernia with strangulation was also considered.

At operation a portion of the old scar was excised and the right anterior rectus sheath was opened. On parting the right rectus muscle fibers a thin walled cyst containing clear yellowish fluid and some blood was exposed. This was shelled out and the incision closed.

The pathological report indicated that the cyst (fig. 1) was a corpus luteum cyst into which hemorrhage had occurred.

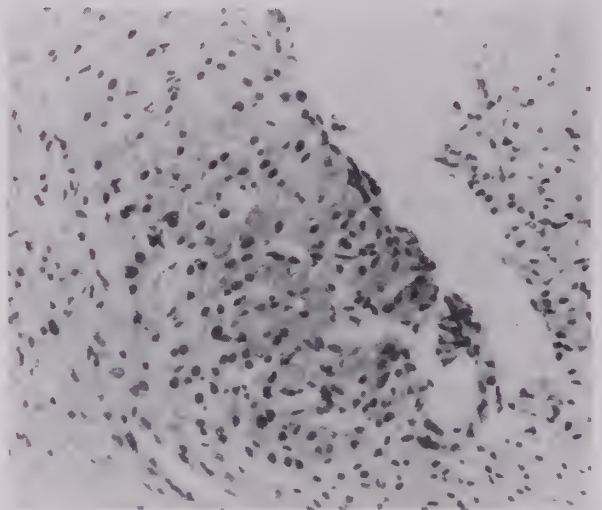


Fig. 1. Luteal cells in wall of cyst in transplanted ovarian substance.



Lessons from Pearl Harbor

Destruction of barracks at Wheeler Field, T. H., December 7, 1941.
Photo by U. S. Army Signal Corps.

OUT of the chaos and confusion—the burns, lacerated wounds and compound fractures—that was Pearl Harbor on that first Sunday of December, 1941—have come many lessons. Not the least among them is the value of the sulfonamides—used topically for the management of the potentially infected traumata.

Field conditions were ideal for the production of Clostridial infections—yet the incidence of gas gangrene was remarkably low and resulted in no deaths. Hospital facilities and surgical skill were hard-pressed and surgical operations were delayed from hours to days. Due in no small measure to the use of the sulfonamides, postoperative mortality was only 3.8 per cent, and most of these fatalities were from shock and hemorrhage.

Topical use of sulfonamides is assuming increasing importance not alone in military prac-

tice but in industry and civil life. These compounds should be regarded as an important adjunct to surgery, regardless of whether the surgeon is dealing with grossly contaminated wounds or maintaining asepsis in his operative field. Further studies must, of course, be made to determine the method of application best suited for each type of wound.

The Squibb Laboratories have available many of the sulfonamide compounds. There are several dosage forms under laboratory and clinical investigation and these will be provided as the need arises and results prove favorable.

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EDITORIALS

FOOD HANDLERS' CERTIFICATES

The present method of examining persons employed or about to be employed as food handlers in the Territory is worse than useless. Not only does it fail completely to identify cases of the only two disorders (pulmonary tuberculosis and the typhoid-dysentery group of intestinal diseases) which are of any real importance in this regard, but it has the almost equally objectionable feature of leading the food handler himself to suppose—erroneously, mayhap—that he has been found to be in good health.

A pitiful example of the latter failing occurred not long ago when a professional cook, an elderly man, was discovered (*not* by a Food Handlers' "Examination") to have advanced bilateral pulmonary tuberculosis with cavitation, and was so depressed by the realization of the situation that he committed suicide.

Another example was reported extensively in the HAWAII MEDICAL JOURNAL last summer: the occurrence of a serious epidemic of typhoid fever among school children because a carrier was employed in the school cafeteria. A proper examination of food handlers might have resulted in her identification as a carrier and her employment could have been prevented. The present method of examination could not possibly have shown her to be a potential source of disease. Prompt action and capable medical attention resulted in holding this epidemic down to only 78 cases and 5 deaths. It is interesting to speculate how many deaths would be needed to arouse the authorities to a realization that something might be done to help prevent a recurrence of such a tragedy. The immunization campaign should go far to prevent typhoid fever from harrassing us again. But we are not immune to bacillary dysentery, and we are not immune to tuberculosis, and contaminated food is a frequent source of both diseases.

It is argued that fluoroscoping all food handlers would not pick up all the tuberculous ones, and that x-raying them all would be expensive. It is expensive to let people get tuberculosis, too. The difference between the two costs is not so very great, probably, and it may even turn out to be less expensive to x-ray them than to let them get by. No one denies that the present procedure (listening to their chests) is approximately equivalent to not examining them at all.

It is argued, too, that stool cultures will be expensive, and that they may fail to identify carriers of typhoid fever and dysentery. Suppose they fail a third or even half of the time: that means it will succeed a half or two-thirds of the time. And every success may mean the prevention of disease in dozens or scores of people. The expense, if cultures are made in little bakelite-capped bottles of medium, using an anal swab prepared by the doctor, will certainly be no more than the present fee. Indeed, it would fall so far short of it that three cultures—which would be incomparably superior to only one in identifying carriers—could very well be made on each prospective handler of food. It might not be necessary to repeat this annually; an evaluation of costs could be made before deciding this question finally.

There is no excuse for continuing the present ridiculous procedure, except the usual one of reluctance to change an established custom. The present examination is utterly useless, and worse. It ought to be completely scrapped, and replaced by two requirements: a negative chest x-ray (taken by the Board of Health now that it has a mobile x-ray unit) and three negative cultures from anal swabs, a day or more apart. But the present method ought to be completely scrapped, even if these suggested procedures cannot be instituted yet!

SURFING IN SEWAGE

Honolulu's sewers discharge approximately 26 million gallons of "raw" (untreated) sewage daily through sewer outfalls between the harbor entrance and Kewalo Basin. It is anticipated that within the next ten years this will be increased to about 35 million gallons.

Sewage—as not everyone knows—floats in sea water, and, like other floating material, will drift in the direction of the prevailing winds. For most of the year, that direction is away from Waikiki. In 1939, 87 per cent of the recorded wind was from the east or northeast, and in 1940, over 75 per cent of it was from this direction. During the winter and early spring months, however, south, southwest and even west winds may blow for considerable periods. In December 1939 there was more total mileage of southwest winds than of northeast. In January 1940 two-thirds of the total wind mileage was southwest or west.

In addition to this, the Ala Wai drainage canal, between the sewer outfalls and Waikiki, discharges into the ocean just west of Waikiki district an average of 10 million gallons a day of heavily contaminated water—and, during flood periods, over 3,000 million gallons a day.

One would expect this combination of circumstances to result at certain times of the year—principally in the winter and early spring—in the contamination of the waters along Waikiki Beach. *It does exactly that.*

A careful bacteriological survey of the waters of the south shore of Honolulu and throughout the Ala Wai canal shows that at these times the colonies of *B. coli* per hundred cubic centimeters of water frequently reach several hundred at points as far southeast as the Natatorium. This survey was conducted between May 1940 and September 1941 by the Bureau of Sanitation of the Territorial Board of Health, under the sponsorship of the Honolulu Chamber of Commerce. It is a careful, detailed, painstaking piece of research. It demonstrates conclusively that potentially dangerous degrees of contamination of the waters at Waikiki are likely to occur whenever the wind is in the west for a sufficient length of time.

The solution proposed is fine screening and chlorination of the sewage, the construction of a suitable jetty to divert the Ala Wai canal drainage further from shore, and filling the present artificial channel, parallel to the shore, which allows this drainage to travel toward Waikiki at very low tide

levels. The treatment of sewage could be intermittent, being necessary only during periods when weather conditions threaten pollution of the water along the bathing beaches.

Not all of these measures can be undertaken during war time. Some of them can be accomplished, however, and perhaps war conditions render them more urgent than they would be in peace time. Official neglect of situations like this is the stuff from which epidemics are made.

DIABETIC IDENTIFICATION CARD

The Commission of Diabetes of the Medical Society of the State of Pennsylvania is urging the adoption of a metal identification tag to be worn on the wrist or around the neck of every diabetic in the state. This records name, address, relative's name, and blood type on one side and records "diabetic" and type of insulin or "no insulin" on the other side. The commission also suggests that the diabetic carry with him at all times an information card, as follows:

DIABETIC IDENTIFICATION CARD DIABETES MELLITUS

IF I AM SICK, GIVE ME ORANGE JUICE OR SUGAR.

INSULIN.....UNITS.

DIET: GM. CH.....GM. P.....GM. F.....CAL.....

PHONE:

DR.....NO.....

RELATIVE.....NO.....

This is a very sensible suggestion for local use and should be easy to sell to our already identification-card-conscious populace.

SILLY CENSORSHIP

The September 1942 issue of the American Journal of the Medical Sciences mailed to Hawaii had one article deleted by government censors. The title and authors' names were cut out of the cover and the table of contents; the article itself was cut out, except for title and authors' names, which were

obscured with black ink. A request for an uncensored copy, made on the supposition that some mistake had occurred, was refused; Dr. Krumbhaar's secretary stated, however, that an effort was being made to find some way in which the missing article could be sent to Hawaii.

On January 15, an uncensored copy arrived, "inspected and approved" by the Board of Economic Warfare "for export by the Technical Data License Division, Export Control Branch, Office of Exports."

The dangerous article turned out to have been written by T. N. Harris and Joseph Stokes, Jr., Department of Pediatrics, University of Pennsylvania School of Medicine, on "The Effect of Propylene Glycol Vapor on the Incidence of Respiratory Infections in a Convalescent Home for Children." It was a carefully controlled series of experiments confirming work done in 1941 and 1942 by O. H. Robertson and co-workers on the germicidal effect

of propylene glycol vapor in air. Harris and Stokes showed that this effect was adequate, even in concentrations as low as between 6 and 33 parts per billion, to sharply reduce the incidence of respiratory infections in a 16-bed convalescent ward.

This work has been extensively commented upon; it was described in Time magazine in the fall of 1942, and discussed in an editorial in the Lancet; Chauncey Leake's monthly summary of the new and good in current medical and related literature drew attention to it. In short, it is not a secret, and has not been a secret. Even had it been a secret, it would not have had any more value for an enemy than, for example, the new Stader splint which affords prompt mobilization for serious fracture cases.

The effect of this behavior on the part of censors is difficult to evaluate in all its ramifications, but some aspects of it seem very clear. It makes them a nuisance to the editorial staffs of the scientific publications which have to submit to their arbitrary rulings; and it makes them a laughing stock to the small section of the public that finds out about it.



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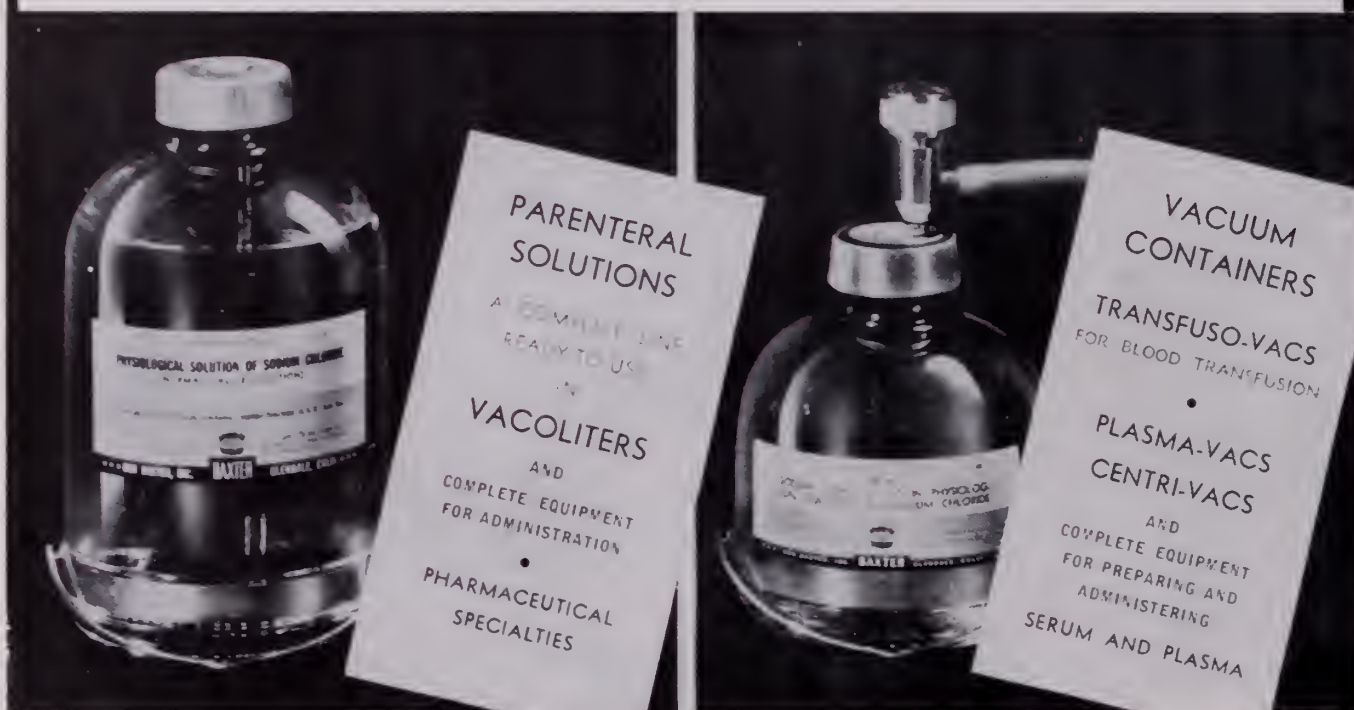
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PROGRESS IN INTERNAL MEDICINE

SPLENOMEGALY

The occurrence of a well marked splenic tumor arrests the physician's attention. He is immediately confronted with the question as to whether this is a primary disease of the organ or whether it is secondary to disease elsewhere in the body.

Most frequently it is part of a systemic disease or is due to disease of other organs. Infectious or cardiovascular diseases, blood dyscrasias or metabolic diseases are suggested. The most common infectious diseases associated with easily demonstrable splenomegaly are malaria, typhoid fever, syphilis, tuberculosis, brucellosis, typhus fever and infectious mononucleosis. Fever toxemia or obvious physical or laboratory evidence should point in these diseases to the proper diagnosis. Cardiac findings may suggest a source of embolic or congestive pneumonia resulting in splenomegaly. Blood dyscrasias are immediately suggested by massive splenic enlargement, leukemia being the most common cause. Blood studies, bone marrow puncture or lymph gland biopsy will make the diagnosis. Metabolic disorders of the lipid group, though rare, are causes of massive splenic enlargement. Splenic enlargement secondary to hepatic cirrhosis is much more common.

"Congestive Splenomegaly"

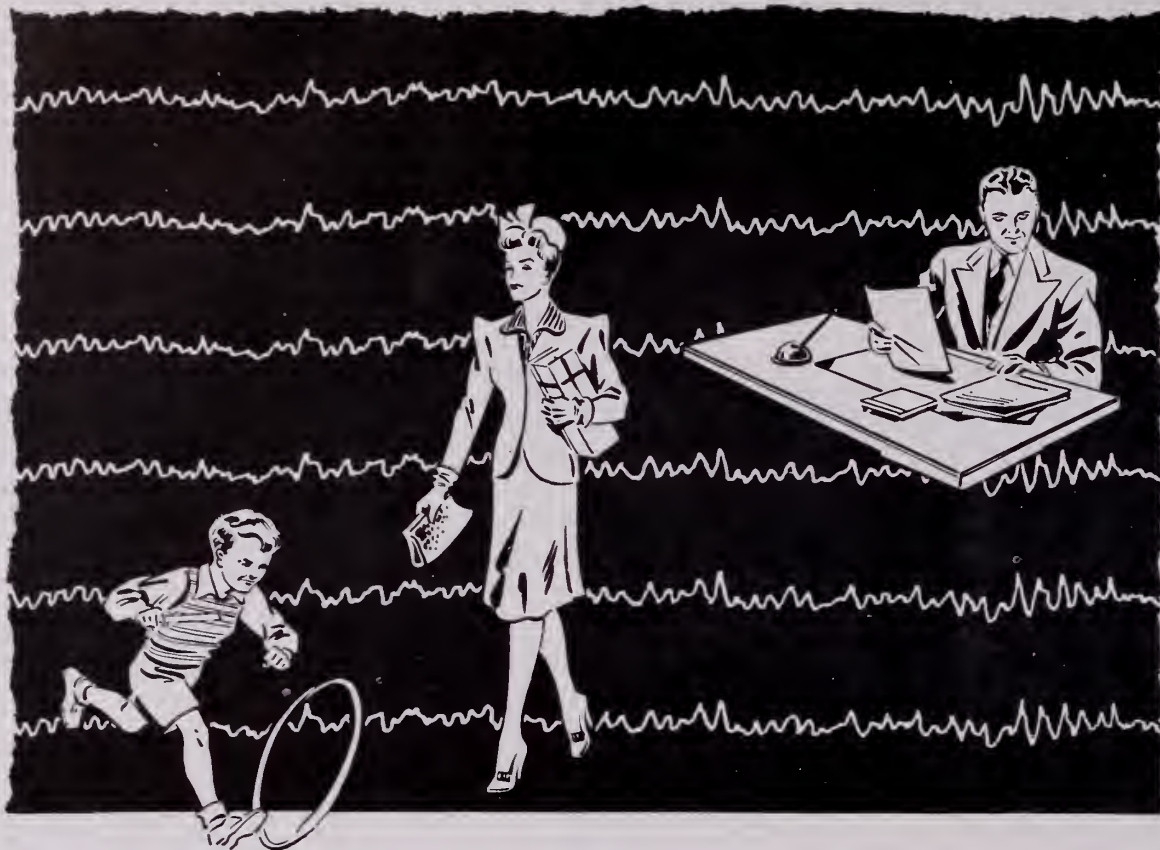
Primary splenic disease is unquestionably rare. Formerly *Banti's disease* was classified as a primary disease of the spleen. Recent clinicopathologic studies have cast doubt upon this concept. William P. Thompson in "The Pathogenesis of Banti's Disease" (*Ann. Int. Med.* 14:255 [Aug.] 1940) gives an excellent modern version of the pathogenesis of this cause of splenomegaly.

Osler and others classified Banti's disease as a primary disease of the spleen of unknown origin. Cure by splenectomy was presented as proof of its being a primary disease of the spleen. The clinical diagnostic criteria presented by Osler have not been changed, viz—progressive enlargement of the spleen without obvious cause; secondary anemia, leukopenia and frequently thrombocytopenia; evidence of increased collateral circulation between the portal and peripheral venous circulation, manifested by prominent thoracoabdominal veins and hemorrhage from

esophageal varices, and finally by ascites (if cirrhosis is associated). The pathologic findings in over 100 cases studied by Thompson indicate a single underlying mechanism, namely, portal vein hypertension with normal peripheral venous pressure. The cause is mechanical obstruction in the portal venous system. Hepatic cirrhosis caused by far the greatest number of cases—68 per cent. Other causes where schistosomiasis, thrombosis of the portal or splenic veins occurring as a result of injury or infection, compression of the splenic vein by tumors, glands or adhesions, or congenital venous anomalies. He advocated the use of a term coined by Dr. R. C. Larabee—*congestive splenomegaly*—as a much better definitive name than "Banti's disease" or "Banti's syndrome."

N. E. Rich has described a congenital form of stenosing sclerosis of the portal vein resulting in portal hypertension (Primary Portal Thrombosclerosis, *Arch. Int. Med.* 69:117 [Jan.] 1942). Cases present clinical and pathologic changes similar to those of Banti's syndrome: congestive splenomegaly, bleeding from esophageal varices and blood changes. Ascites is infrequent because liver damage with resulting reduction of serum proteins does not occur, and anemia is less marked. The early age of onset is the chief clue to the congenital cause. If the term congestive splenomegaly is substituted for Banti's disease, this small group of cases is properly included. Splenectomy is successful because it affects a reduction in portal blood volume, thus reducing the portal hypertension which is the underlying cause of symptoms.

An unusual syndrome in which splenomegaly is a feature has recently been reviewed by Armstrong, *et al.* It is the *Cruveilhier-Baumgarten syndrome* (Armstrong, E. L.; Adams, W. L.; Tagesman, L. J., and Townsend, E. D.: The Cruveilhier-Baumgarten Syndrome; Review of the Literature and report of Two Additional Cases, *Ann. Int. Med.* 16:113 [Jan.] 1942). This rare condition is due to the association of pathologic conditions causing portal hypertension with blood vascular anomalies, particularly a persistent patent umbilical vein. Large venous anastomoses associated with this vascular anomaly cause marked dilatation of the thoraco-abdominal veins and an abdominal venous murmur and thrill, which is the



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THE oscillating "finger" of the electroencephalograph, recording abatement of abnormality of brain waves, tells but a part of the story of epilepsy treatment with Dilantin[†] Sodium. Fewer and less severe seizures, more normal social and economic life have been observed in many thousands of epileptic patients receiving this modern anticonvulsant.

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KAPSEALS

DILANTIN SODIUM

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1. Palmer, H. D. & Hughes, J.: *The Penn. Med. J.*, Aug. 1942

unique diagnostic finding. Other clinical findings are those of portal hypertension: abdominal distension, digestive disturbances, hematemesis, and splenomegaly. Hepatic cirrhosis is absent. The disease is usually fatal by the third decade of life, death being due to portal decompensation. Splenectomy is of no value, in fact is contraindicated because of the danger of hemorrhage from greatly dilated venous channels in the abdominal wall.

Primary Splenic Neutropenia

Two diseases are more properly classified as primary splenic disease, namely, familial hemolytic jaundice and thrombocytopenic purpura. A third closely related condition, primary splenic neutropenia, has been reported recently by Wiseman and Doan (Wiseman, B. K. and Doan, C. A.: Primary Splenic Neutropenia: A Newly Recognized Syndrome, Closely Related to Congenital Hemolytic Icterus and Essential Thrombocytopenic Purpura, *Ann. Int. Med.* 16:1097 [June] 1942). This is a condition of primary splenic dysfunction and hyperfunction. The splenic scavenger cells, the clasmotocytes, become overactive in destroying both young and mature white blood cells. This excessive destruction of peripheral blood elements carries over in a lesser degree to red blood cells and platelets. The clinical picture is characterized by splenomegaly, neutropenia (with

hyperplasia, not hypoplasia, of the myeloid elements of the bone marrow), thrombocytopenia and hemolytic anemia. The presenting symptoms are weakness, irregular fever, coryza or angina, and perhaps bleeding (purpura). Splenomegaly is present. Repeated blood counts reveal progressive neutropenia. In differential diagnosis one considers particularly Banti's syndrome, leukemic leukemia, hypoplastic anemia, and malignant neutropenia. The absence of symptoms and signs of portal hypertension excludes Banti's disease. Studies of sternal bone marrow smears exclude leukemia in a subleukemic phase, aplastic anemia, and usually malignant neutropenia. The history in regard to drugs or toxins as a cause of neutropenia is of importance, however. Familial hemolytic jaundice and essential thrombocytopenic purpura may be somewhat more difficult to differentiate, since manifestations of both red blood cell and platelet destruction occur in primary splenic neutropenia. Indeed, the three conditions appear to be very closely related, in that the destructive tendencies in each apply only in a more or less selective degree to young and mature white blood cells, red blood cells, and platelets, respectively. In all three conditions splenectomy is followed by an immediate increase in all circulating blood elements. It is apparently a cure for primary splenic neutropenia.

S. E. DOOLITTLE, M.D.



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RECENT ADVANCES IN SURGERY

SISTER KENNY'S PILGRIMAGE*

Sister Kenny and her work have aroused more discussion than any other orthopedic problem in years. When she arrived in the United States she had a number of introductions and went first to Dr. B. O'Connor of New York who pushed her aside and referred her to Dr. Hansson of Cornell. He also sent her on her way.

Discouraged, she went to Chicago, where she consulted Dr. Coulter of Northwestern. He referred her to Dr. Phil Lewin, who was not impressed with her work. She left Chicago and saw Dr. Henderson of the Mayo Clinic. He listened to her story for two days, and appointed Drs. Cole and Knapp to investigate her method of treatment. Dr. Knapp took her into his home and discussed "spasms," "incoordination" and "mental alienation," terms all foreign to the medical men of this country. She discussed "polio of the shoulder." All of her principles were different from ours.

Then Dr. O'Connor wrote that he wished to serve on the committee to evaluate her results; Dr. Pohl also wished to serve on the committee, having previously refused to consider her work at all. He is now a most enthusiastic advocate and has publicly urged that this work be made known generally to physicians of America as quickly as possible because of the tremendous and far-reaching advantages the Kenny method has over our previous methods of treating infantile paralysis.

After seeing her work Dr. I. McQuarrie stated that if any of his children had polio he would want the Kenny treatment used.

Dr. Ober of Boston, a skeptic at first, admitted that Sister Kenny had taught him something new.

Dr. Lewin opposed the procedure until he observed her work and has since acknowledged the Kenny treatment as one of the most outstanding advances since the time of Sir Robert Jones and Hugh Owen Thomas. He reports that in the early stages of infantile paralysis, the length of time during which pain, tenderness and spasm are present is greatly reduced and contractures caused by muscle shortening are prevented by the Kenny method.

Dr. Coulter now believes that Sister Kenny has made a great contribution to the field of physical

therapy. Likewise, Dr. Hansson now admits that Sister Kenny has done more for physical therapy than anybody in the last decade.

Dr. Stindler, while not accepting the procedure in its entirety, has observed many symptoms which Nurse Kenny describes.

Kenny Concept

What is this remarkable procedure? If we accept the Kenny conception of the disease, we must dismiss flaccid paralysis from our mind. Early symptoms are "muscular spasms," "incoordination" and "mental alienation."

Treatment

The patient is placed in a basic position in bed on a firm mattress with a foot board. "Spasm" is treated by hot fomentations made of old woolen blankets boiled and wrung dry in a wringer—a blanket, then oiled silk, and then a layer of dry blankets. These are renewed every two hours. Massage is not employed at any time. Passive motion is carried out every day. Stroking of the insertion of the muscle is done to assist in establishing mental awareness. If there is no trace of motion, the reflexes are stimulated by placing the muscle on the stretch, then stimulating.

It is concluded that muscle re-education depends on:

- (1) Relief of spasm.
- (2) Teaching of muscle awareness.
- (3) Combatting incoordination.
- (4) Re-training nerve pathways

Comment

In her book, published in 1941, Sister Kenny gave an outline of symptoms and treatment, much of which has been changed. Hampered by lack of fundamental training in medical science, she was unable to describe what she was apparently able to detect. One physician observed, "I can get nothing out of her writings and lectures, but when she is at the bedside she is another Osler."

The Kenny technique is not universally accepted, partly because it is difficult for the average physician to accept these new concepts of the pathologic physiology of poliomyelitis.

The tremendous enthusiasm for the Kenny procedure, however, seems to a large degree warranted.

A. L. CRAIG, M.D.

*Abstracted from a recent issue of the Proceedings of the Staff Meetings of the Mayo Clinic.

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CLINICO-PATHOLOGIC COMMENT

WHOLE BLOOD BANK

The only logical replacement for lost red cells is more red cells. These come best from the patient's own bone marrow. If the need be too great or too urgent they come best from a donor of the same blood group—with consideration for the sub-groups A₁ and A₂. If the time for that be too short, the known universal donor may be used, without cross matching, if this professional "O" donor be known not to have excessive quantities of A and B red cell agglutinins. (Any O donor may be used if the newly isolated substances which neutralize these agglutinins for A and B cells, are available, and are added to the "universal" blood, making it truly universal.)

Theoretically, the ideal method of transfusion is the use of whole unaltered blood by the direct method. In that fashion other substances besides plasma and cells are donated: platelets, stable and unstable antibodies and, particularly, complement. In infections the latter is not usually sufficiently considered and it is destroyed by sodium citrate. Sodium citrate is anticomplementary in a final dilution of 0.066 per cent; the usual final dilution in blood transfusions is 0.2 per cent. The direct method presupposes an apparatus mechanically and chemically perfect, and an operator of very considerable manual dexterity. Since the two rarely occur in conjunction, the direct transfusion method has fallen into disuse and has been almost wholly replaced by the indirect method, using sodium citrate. (Heparin and other anticoagulants have not become popular.)

Eighteen or twenty years ago we here in Hawaii performed transfusions only rarely and then as a last resort on cases in extremis; that usually made veins rather hard to find. At 2 a.m. there was little opportunity for blood typing and cross matching, so that professional universal donor "O"—then called Type IV—used repeatedly without untoward results, became popular.

Today transfusions are given for almost anything (often the indication seems trivial) and it appears generally to be forgotten that the operation is not altogether without risk. With the advent of our Plasma Bank, which has recently offered whole, typed, sero-negative blood, of variable age, the num-

ber of transfusions has increased. So long as the enthusiasm of the donors continues, and publicity is available, the number of donors will be sufficiently large and the turn-over so rapid that no whole blood need be stored more than two or three days before use, unless it be the relatively rare A B group. Even the short two or three day storage, as now practiced, is not ideal, however.

If, as and when the war is over, and the donors lose their enthusiasm because publicity is no longer so generously available, there will be a temptation to store the drawn blood for longer and longer periods of time—until hemolysis becomes apparent along the plasma line (forgetting the invisible hemolysis and changes that go on near the bottom of the cell layer). The value and safety of the use of such blood have been open to very much question. Wassermann, Volterra and Rosenthal, in the September 1942 issue of the American Journal of the Medical Sciences, show why such questions are valid. Red cells destroyed within the body are excreted as urobilinogen in the feces and urine. They show that the amount of urobilinogen excreted, after transfusion with stored blood, is directly proportional to the duration of the storage. They conclude from their observations that the use of blood stored for more than seven days is inadvisable in treating anemia.

They say: "Although there is a destruction of a small part of the red blood cells in storage and the erythrocyte fragility increases progressively with the duration of storage, these changes do not militate against the use of this type of blood in general medical conditions. Previous work has shown that blood stored over ten days usually causes a transient jaundice due to the *initial destruction of the older cells transfused.*"

Experiments in vitro have recently yielded us results from which one might draw the same conclusions. Blood was prepared as at the local blood bank and divided into separate containers. At intervals a container was opened and the contents placed in hypotonic saline solution and the amount of hemolysis determined. For example, one protocol:

Hemolysis of Citrated Blood

Time Interval from Bleeding. Storage at 4 C.	Percent of Hemolysis	
	0.42 Saline	0.48 Saline
One hour	6.0	2.8
Two days	18.0	15.0
Three days	26.0	21.0
Four days	36.0	29.0
Five days	41.0	35.0
Seven days	48.0	48.0

The authors mentioned used three cases of aplastic anemia and studied red cells and red cell volumes, hemoglobin, and particularly fecal and urinary urobilinogen, before and after transfusions of bloods of varying storage periods. In one case receiving five day old citrated blood, there was an immediate rise in urobilinogen (representing dead red cells); there was no increase following transfusion with fresh blood.

In the second case there was no increase in the urobilinogen after fresh citrated blood, a marked increase after five day old blood, and a huge increase after twelve day old blood. The third case is most instructive and suggests some constructive criticism of our local methods. This patient received, in succession, 300 cc. each of fresh citrated blood, seven day old citrated, seventeen day old citrated, then seven day old citrate-glucose blood (DeGowin method)*, then fourteen day old citrate-glucose blood and finally 300 cc. plasma in contact with citrated blood for twelve days.

The results might be tabulated as follows; however, it is well worth the time of any one doing transfusions to study the original article.

Urobilinogen Excretion Following Transfusions

		Fecal Urobilinogen		
		1st 3 days	2nd 3 days	Total
Pre-transfusion	1.5			
Fresh citrated		2.0	90.0	92.0
Seven-day citrated		185.0	260.0	445.0
Seventeen-day citrated		440.0	125.0	565.0
Seven-day citrate glucose		140.0	85.0	225.0
Fourteen-day citrate-glucose		155.0	160.0	315.0
Twelve-day plasma		105.0	110.0	215.0

The charts of the authors on these tabulations demonstrate that the citrated blood cells are more fragile and therefore more rapidly destroyed in vivo than those in citrate-glucose blood (DeGowin technique).

A simple in vitro experiment has recently yielded us confirmatory data. Equal quantities of blood from the same donor were prepared for storage by the

*100 cc. of 3.2 per cent dihydric sodium citrate plus 650 cc. of 5.4 per cent anhydrous dextrose (at 4 C.) plus 500 cc. blood. Store at 2 C.

simple citrate method as practiced here and by the DeGowin citrate-glucose method, and stored at 4 C. for nine days. (Microscopically, blood stored by the citrate method then showed marked rouleau formation and occasional crenated cells; blood in the citrate-glucose mixture showed even distribution of cells without rouleau formation and practically no crenated cells.)

At the end of the nine days, the supernatant fluid was pipetted off, the sedimented cells washed with 15 cc. saline solution, centrifuged equally, the supernatant fluid removed, and the cells re-suspended in 0.5 cc. of physiologic saline with equal mechanical trauma; this suspension was then mixed with serial hypotonic salt solutions and the percent of hemolysis was read in an electric colorimeter. The results demonstrate the greater fragility of the red cell stored in citrate only.

Percentage of Hemolysis in Nine Day Old Blood

Percent salt concentrations	0.50*	0.48	0.46	0.44	0.42	0.40	0.38
Citrate only	58*	53	55	79	86	86	90
Citrate & glucose	14*	5	6	11	11	26	79

*This greater percentage of Hemolysis in 0.5 per cent than in 0.48 per cent is not an accident; it has appeared rather consistently in similar experiments. We are at a loss to account for it.

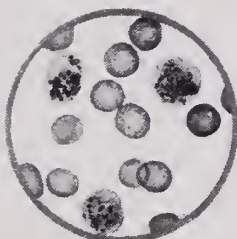
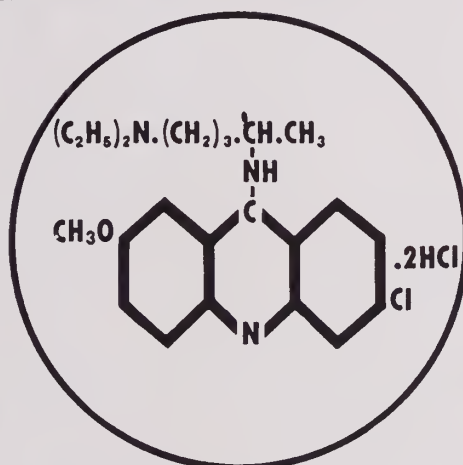
Wassermann et al say of the use of blood preserved by the DeGowin's glucose-citrate mixture: "A slight rise in the pigment excretion occurred but was not comparable to the rise following the seven day old blood stored with just sodium citrate as the preservative. Blood stored for fourteen days with the same glucose citrate mixture produced a rise in pigment excretion which was maintained at three times the original level for two weeks. A sharp, distinct rise that occurred following the use of only sodium citrate as the preserving fluid was not manifested in this case." In other words, it took that case of aplastic anemia, which is destructive of red cells, particularly foreign ones, two weeks to destroy the fourteen day DeGowin blood, while the citrated blood was destroyed in a much shorter time.

In aplastic anemia one would expect accelerated destruction of transfused cells, the more fragile ones immediately, the more resistant ones later. From the data of Wassermann et al. it becomes obvious that citrated blood is destroyed much more rapidly than is the citrate-glucose blood. While safe (by present criteria) time of storage may be gained by the DeGowin method, quality also is gained, if the storage times be equally short. It is not enough to know only that stored blood will be "safe" to give a patient; one must also know that it will do him some good.

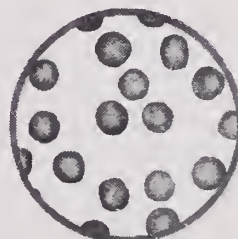
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EMERGENCY MEDICAL SERVICES

(FORMERLY MEDICAL PREPAREDNESS)

MEDICAL PREPAREDNESS ON THE MAINLAND

Blood Banks

Of the eighteen major blood bank centers on the mainland, I visited nine, and can say that we compare well with them. There were, of course, the usual controversies on minor points and each blood bank director has definite ideas as to proper procedure.

All of the units, or so-called blood banks, observed, are in fact far from being blood banks according to our conception of the term. With the exception of the Irwin Memorial Bank in San Francisco, which is functioning with the approval of the San Francisco Medical Society, and one other, most of these units are nothing more than procurement centers functioning under the Red Cross, their product being turned over to the processing laboratories of the large biological houses for conversion into powdered plasma. All the technical work, the sterilizing and washing of equipment, is done by the biological houses, who also furnish the units complete with the citrate in the bottle, so that the procurement centers are concerned only with getting donors and bleeding them. Most of these centers do not even type the blood. They do serologic tests on all bloods, however, usually the Kline exclusion test. Blood taken and discarded by these banks averages from 8 to 13 per cent: 1 to 3 per cent for positive serology, 3 per cent from contamination, and 2 to 9 per cent for miscellaneous reasons.

Some of the units are using phenyl mercuric nitrate as an antiseptic, others use merthiolate solution, and still others use sodium sulfathiazole.

Follow-up studies of approximately 300,000 donors indicate no instance of harmful anemia resulting from donation of blood.

The Red Cross is attempting to produce 400,000 units by July 1, 1943. It has been established that for every 1,000 doses of the finished product 1,250 donors are required. The mainland procurement centers have had the same difficulty as we in getting volunteers and their largest single worry likewise has been their publicity campaign.

Our program here in Hawaii differs from those

on the mainland in that we are encouraging the use of blood and plasma for peace-time purposes. It seems to me that the community which has been so generous to the blood bank should be allowed to benefit from it, and we have urged the doctors to make as much use as possible of the blood and plasma collected.

Up to December 7, 1942, excluding the 1600 units used during the Blitz, we loaned 412 units of whole blood and 204 units of plasma. At present we have approximately 8,205 doses of plasma, all bacteriologically and serologically negative and ready for immediate use. We have typed 47,982 people in Honolulu alone, and our average rejection rate for all reasons is 5 per cent. Positive serology runs each month between 1 and 3 per cent. To date we have had approximately 15,980 donors.

It is well within the realm of possibility that the Honolulu Blood and Plasma Bank, and other banks in the Territory, may become permanent peace-time activities. The record shows an increasing demand for whole blood and plasma for current daily use in the various hospitals. Thus we have, under wartime conditions, developed a program and created a demand for services which are also a peace-time necessity. Plans for a long range program to assure continuation of the blood bank operation are under consideration and will be presented to the profession in due time for discussion.

Medical Procurement

What is meant by medical procurement can be found in the literature, but many men do not study such matters very thoroughly. Briefly, the business of medical procurement is aimed at distributing medical services to the armed forces on the basis of six and one half physicians to every thousand enlisted personnel. Considering that the plan for the coming year calls for 7,500,000 new men in the service, it is easy to understand that the civilian population throughout the United States and its possessions will suffer from a shortage of physicians. A great number of the most active age-group of physicians is being taken into the service. If one considers that less than half of the total 180,000 physicians in the United States are under 45 years

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of age, one can readily appreciate the number and capacity of those remaining in civilian practice.

Medical Preparedness, Gratis

Medical men must speak of medical activities, because the non-medical writer rarely mentions the medical man or his part in this great program. It has been estimated that 25,000 physicians have given a minimum of \$25,000,000 in free time as physicians on the draft boards. It is true that not only physicians have given free services; key men in industry have devoted much more of their time proportionately without thought of remuneration; but one must consider that all a physician has to sell is his personal service, and his practice cannot carry on for him while he performs the numerous duties thrust upon him from the outside. The work done by the local medical profession, not only since the Blitz of December 7, but for a year before that time, has not been equalled in any place in the United States. While medical preparedness in coast-wise cities has been very active since the declaration of war, very few communities had any definite program before that time. We can point out with pride that our medical preparedness program was a completed thing, all ready to go when war came. I stressed this point wherever possible and I am determined that no one shall forget that we medical men of Honolulu were "in there pitching" long before those of any other community.

Aid Stations

Our first aid stations are well manned, well directed and efficient. The money spent maintaining these 19 stations must be regarded as a form of insurance, but more than that, this must be regarded as a worth while community benefit, considering the hundreds of hours spent by doctors teaching thousands of people the rudiments of first aid, knowledge which will be an asset throughout each individual's life. Here again the medical profession gave generously. However, a year has passed and we have had the benefit of trial and error, and it might be well to review the program and evaluate the services and the cost both in man-hours and money. We

should be concerned with conserving precious time for the busy practitioner and at the same time be willing to compensate him for the actual work done. If one first aid director is being paid more than he is giving in time, some curtailment of compensation should be made. On the other hand, those directors who are giving more than the usual time and interest should be reimbursed proportionately.

F. J. PINKERTON, M.D.
Territorial Director
Blood and Plasma Banks

ISLAND OF HAWAII

Dr. A. Orenstein, Director of Civilian Medical Affairs for this Island, reports little change in medical preparedness plans. Progress is being made in the training of personnel and in the equipment of aid stations and hospitals. There is real progress in the blood and plasma bank program with the development of a small, well-trained, full-time staff and with a better response on the part of the public.

The Office of Civilian Defense has constructed an excellent hospital at Olaa which is now ready for occupancy except for a few items of equipment. This hospital, without crowding, has 105 beds, which, together with about 60 additional beds and bassinets in the Olaa Sugar Company's hospital, gives this unit a capacity of 165. This hospital will be used by the O.C.D. as it is needed, probably serving as an evacuation hospital for the Hilo District and for all casualties in the Puna District. The hospital unit is quite complete with a separate "blitz unit" composed of segregation room, wash room, shock rooms, minor and major surgical rooms, x-ray and laboratory. The main hospital has a separate obstetrical unit, kitchen, laundry, isolation unit and cottages for the staff. The entire plan was carefully worked out over a period of many months, the prime objective being to efficiently take care of a sudden load of casualties.

Dr. Harry Arnold, Sr., Territorial Director of Emergency Medical and Ambulance Service, made a trip to this Island in December and inspected the work done, offering much valuable advice.

H. M. PATTERSON, M.D., reporting.

"Dr. Jim"



"DR. JIM" has a much more dignified name, of course . . . but to Georgie and Betty he's just "Dr. Jim" . . . the wonderful man who makes them well and keeps them well.

He has watched over them ever since the day they were born, and now with danger lurking in the skies--as well as in microbes and such--the Doctor becomes more important than ever.

There are hundreds of "Dr. Jims" in Hawaii who

have been putting in some mighty long hours, laboring under severe strain since December 7th.

. . . They probably won't get any medals or have any cigars named after them but we believe the entire community is conscious of the noble service they are performing.

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COUNTY SOCIETY REPORTS

HAWAII COUNTY MEDICAL SOCIETY

The meetings of the Hawaii County Medical Society for the past several months have been marked by the interest taken by the medical officers from the Army. There never was better feeling here between the civilian and military personnel, which should insure fullest cooperation whenever called upon.

Our Society now seems generally in accord with the library policy of the Territorial Medical Association. We have just received the 1940 and 1941 volumes of the Index Medicus. A library committee has been appointed to study the needs and to present a plan whereby we can establish the nucleus of a small library on Hawaii. This committee is a perpetuating one, composed of three members, serving three years, two years and one year respectively, with one new member appointed each year to serve for three years. With the Index Medicus at hand, the services offered by the Honolulu County Library, and the purchase and donation of journals and books, a good library should result.

Since the last report, several interesting papers have been read. The presence and active participation of the military medical personnel added much to the interest of these sessions.

A symposium on "The Place of Bronchoscopy in Pulmonary Tuberculosis" was presented in July by Drs. E. A. Tompkins, H. E. Crawford, and M. L. Chang; the indications and technique of treatment of tuberculous tracheobronchitis were emphasized and case studies with x-rays were presented.

In September Dr. T. Yoshina gave a comprehensive paper on "The Care of the Premature Infant," stressing certain procedures in therapeutic management, especially the avoidance of initial chill, prevention and early adequate treatment of respiratory distress, proper individualized feeding prevention of infections and nutritional deficiencies.

The semi-annual meeting was held in October at the Mountain View Hospital, the Society being dinner guests of the military medical personnel of that hospital. Several interesting papers were given by the hosts; illustrative case studies were presented. An entertaining evening of games followed.

The 209th regular meeting of the Hawaii County Medical Society was called to order on November 24, 1942, at 4:00 p.m. in the staff room of the Hilo Memorial Hospital by President Patterson. Ten members and 12 guests were present.

Dr. M. H. Chang read a paper on "Dermatophytosis," stressing its importance in civil and military life, its diagnosis and various local treatments. Capt. Glassman, M.C., A.U.S., discussed the prophylaxis and therapeutic management. Dr. W. N. Bergin gave a paper on "Cotton as a Suture Material," describing the technique of its use in surgery, the results and advantages of cotton over other suture materials. This was further emphasized in the discussion by Major John A. Williams, M.C., A.U.S., who cited experiments performed by himself.

The secretary's report was read and approved. The president read a letter and format of an agreement with the Hawaii Vocational School whereby the members of the Society agreed to conduct physical examinations and render first-aid treatment as previously decided upon. The question of physical examinations and tuberculin testing of intermediate and high school students (including the Olaa Annex) was discussed. It was voted that the Society follow the precedent set in previous years whereby the physician was selected in rotation from a list already supplied to the agencies.

A letter was read from the Secretary of the Territorial Association regarding various matters pertaining to the library. It was stated that the Society would be provided with the Cumulative Index Medicus for 1940, 1941, and 1942. Some discussion followed regarding the necessity for a better organization of a library for the county society in conjunction with the staff library; action was deferred.

Dr. W. F. Leslie, Superintendent and Medical Director of Puumaile Home, brought up for discussion the appointment of a consulting staff for that institution, this staff to include thoracic surgery, general surgery, urology, pediatrics, medicine, ophthalmology and otolaryngology, and obstetrics and gynecology. He stated that members of the consulting staff would be remunerated at the rate of

\$10.00 per visit and appointment would be annual. It was suggested that the scheme was a commendable one and that the appointment of such a staff be left in the hands of the medical staff of Puumaila Home.

The 210th regular meeting of the Hawaii County Medical Society was called to order on December 22, 1942, at 4:00 p.m. in the staff room of the Hilo Memorial Hospital by President Patterson. Sixteen members and six guests were present.

The secretary's report was read and approved.

Capt. Marcus Flinter of the Board of Health showed colored sound movies on syphilis, dealing with the diagnosis of early, late and latent syphilis and its therapeutic management. Capt. Flinter discussed measures used to control prostitution; serological tests in the diagnosis of syphilis and the facilities available at the local Board of Health; dissemination of information to the lay public, and drugs available for the use of the private practitioner.

Transfer cards on Drs. W. F. Leslie and R. P. Wipperman were turned over to the Board of Censors.

The President announced receipt of a letter from the editor of the HAWAII MEDICAL JOURNAL stating that there will be no future "county issues" and requesting papers for the coming January issue.

The President announced the arrival of 1940 and 1941 copies of the Index Medicus. After considerable discussion regarding the advisability of improving the library facilities of the society, it was voted that a committee be appointed to investigate the library situation and to make recommendations regarding the improvement of facilities. It was voted that this committee be a standing committee composed of three members to serve 1, 2 and 3 years, respectively, and that a new member be appointed annually.

The time for future meetings was again brought up. It was agreed that this be left to the officers, who should give some consideration to the time of the full moon.

M. LEON CHANG, M.D., Secretary.

HONOLULU COUNTY MEDICAL SOCIETY

A summary of the activities of the Board of Governors and the membership meetings from October through January 8 follows:

The Board of Health announced that there are available to physicians, on loan without charge, 12 lumbar puncture sets.

Dr. Enright reported a mild epidemic of mumps and an increased incidence of enteritis and diarrhea.

Dr. Lyle G. Phillips was appointed to take the place of Dr. Gaspar on the Standing Medical Committee of The Queen's Hospital, Dr. Gaspar having resigned because he could not attend meetings regularly.

The Board of Governors, upon recommendation from the Committee on Forms of Medical Practice, is attempting to interest the Firemen to adopt the H.M.S.A. plan.

Work preliminary to a revision of the Industrial Accident Fee Schedule has been done on the x-ray, laboratory, and eye, ear, nose and throat sections.

The Society was notified by the O.C.D. that the Military Governor had approved of physicians having brighter automobile headlights for night driving; $\frac{1}{4}$ " x 2" slits, the same size as on police cars, may be used.

In cooperation with the Health Education Committee of the Society and the Board of Health, the Department of Public Instruction is planning an x-ray survey of all school personnel.

The Library has just acquired the residue of the U.S.P.H.S. medical library of the Kalihi Hospital, which includes many years of bound medical journals, such as The Lancet and J.A.M.A. back to 1900, and many others.

For some time the Board of Governors has been studying the matter of group insurance and has circulated to the membership a proposal of the U. S. Life Insurance Company covering accident, sickness and life benefits. Final action depends on the members' response since the plan is contingent upon 75 per cent of the membership participating.

The Society was informed about the work of the Hawaii Nutrition Committee and the establishment of a diet consultation service at the Board of Health, and endorsed the program of the Nutrition Committee to help it get favorable action on a request for funds from the Chamber of Commerce. Discussion of the dietary health of war workers and suggestions for improvement of other factors detrimental to the health of this group led the Board of Governors to appoint a committee composed of Drs. Withington (chairman), Doolittle, Lee and Walker to collect material and draft recommendations for submission to the military authorities.

Bulletin from the Preparedness Committee to the Honolulu County Medical Society

The attention of the Medical Society is earnestly invited to the following facts:

The Preparedness Committee of the Honolulu County Medical Society has since the organization of the O. C. D. been the advisory board which has guided the policies of the medical section of the O. C. D. It has met at the call of the chairman whenever questions of policy have arisen which seemed fundamental and also meets at any time at the request of any member of the Committee or the Board of Governors of the Honolulu County Medical Society.

One of the freedoms for which we are fighting in this war is freedom of speech. No one questions the right of any citizen to adversely criticize the conduct of any public official. As medical men, however, we have set up an organization to guide the medical aspects of the civilian defense program and it is highly prejudicial to the success of this program to have doctors, even members of the committee itself, seriously criticize the policies and operations of the medical organizations and even the personal affairs of members of the medical OCD set-up without having brought these criticisms first to the attention of the Preparedness Committee and ask for their rectification. Any physician who has a criticism to offer is invited to present it to the Board of Governors of the County Society who will forward it to the Preparedness Committee with recommendations or to any member of the Preparedness Committee who will ask for a meeting of the committee to deal with the question presented. Owing to the fact that the Preparedness Committee no longer controls the operations of the medical civilian defense organization, but is merely advisory there can be no guarantee that its advice will be followed, but up to now it has been and it is probable that it will continue to be.

This is a plea then for unity as a Medical Society and for seeking rectification of practices which are objected to, by the medical men concerned, rather than by broadcasting them to the general public.

H. L. Arnold, M. D., Chairman
Preparedness Committee
Honolulu County Medical Society.

The Board adopted a resolution in tribute to Marguerite Peters for her untiring and brilliant work, both managerial and professional, expressing its regret that it became necessary for her to resign as Superintendent of Kapiolani Hospital, and stat-

ing that her work has not only enabled Kapiolani to rise from mediocrity to excellence, but has influenced the standards of all hospitals in the community in the practice of obstetrics and gynecology in particular.

The Board went on record as endorsing the proposed plan for the expansion of obstetrical facilities at Queen's Hospital by 100 additional beds and at St. Francis Hospital by 35 beds.

Honolulu County Medical Society,
510 S. Beretania St.,
Honolulu.

Re: Hawaiian Constructors

Gentlemen:

All of the work heretofore being performed by the Hawaiian Constructors has been taken over by the Corps of Engineers, U.S.A., as of February 1, 1943, therefore the Hartford Accident & Indemnity Company will not be responsible for bills contracted on account of injuries sustained by employees in any of the work heretofore being performed by Hawaiian Constructors, after this date.

We suggest that it may be advisable for you to circularize your members because we have found in the past that certain injured employees of the Engineers have requested medical attention from private physicians; as you are aware the Engineers as a rule will not pay any medical fees for such accidents because if an employee is injured during the course of his employment the Corps of Engineers requires him to obtain medical attention from U. S. Army doctors.

Of course the Hartford Accident & Indemnity Co. will still recognize bills in connection with accidents sustained prior to February 1 by employees of Hawaiian Constructors.

It might be advisable for you to notify all doctors that should an alleged employee of Hawaiian Constructors request medical attention for an injury occurring on or after February 1, 1943, they should immediately get in touch with Mr. L. J. Krill of this office, as there will be only a very few employees continued hereafter and these will be exclusively engaged in office work.

Yours very truly

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NOTES AND NEWS

To the Editor:

Being one of the few civilian pathologists in Honolulu to whom Dr. Fennel referred in a recent article, I feel impelled to add my voice to his in stressing the need for additional pathologists in the Territory.

From there on, however, we speak a slightly different language. Dr. Fennel feels that The Queen's Hospital has by virtue of its "blind policy" kept any enterprising young pathologist from coming out here. Actually I do not quite believe that is so. If this prospective man had come here to see the lay of the land, here is what he would have found in regard to private laboratory practice.

The Queen's Hospital's income from out-patient work during 1942 has varied from \$400.00 to \$800.00 per month. Of this income \$200.00 to \$500.00 has been from Friedman tests. He obviously could not begin to do all these Friedman tests in, let's say, the Young Hotel Building. Dr. Fennel may point out in reply that our fees are unusually low. Well, suppose we doubled our fees. His income would still not be particularly appealing. I do not know how much outside work the other hospitals and The Clinic do, but I doubt very much whether these incomes would add sufficiently to make a private laboratory practice attractive.

This doctor would also have found that a fairly large number of doctors have office personnel to do blood counts, urines, stools and other easily performed tests. Some even do serologies.

All in all, it seems to me that prospects for a commercial laboratory are not very bright from the pathologist's point of view.

Now let us look for a moment at the question from the point of view of the patient and his doctor. Under the conditions described above, in order for a pathologist to have a reasonable income, his fees would have to be quite high. The doctor and the patient would have to think three or four times (normally he should think twice) before ordering a given procedure. The consideration of cost should be reduced to a minimum. If a laboratory test can possibly help to make a diagnosis it should be ordered, and I cannot see a patient paying \$5.00 for a Wassermann just to rule out syphilis.

Dr. Fennel noted in his article, *Fee Schedule*, that the number of laboratory tests performed has increased tremendously. To be able to do all these tests would require equipment and materials which would be rarely used. To invest in these would be poor business, yet the pathologist should be able to provide all these services.

The solution to me is a fairly simple one. There is no reason why two hospitals could not hire and share a pathologist together. That would bring in at least two new pathologists. The City and County could undoubtedly use a full-time medical examiner who could spend part of his time at The Territorial

NEW MEMBERS

CLARENCE Y. SUGIHARA, Marquette, 1941
CLARENCE FONG CHANG, Rush, 1940
MICHAEL GURDIN, LT., M. C., USNR, Tulane, 1933 (Service)
FREDERICK BENJAMIN WARSHAUER, Colorado, 1940
COLIN CRAIG MCCORRISTON, Harvard, 1939
FRANCIS DEAN NANCE, Rochester, 1931
ELI MORTON LIPPMAN, LT., M. C., USA, Long Island, 1940 (service)
ROBERT G. BENSON, transfer from Maui
C. J. KUSUNOKI, transfer from Maui.
PETER HENRY BUCK, Otago, 1904
GEORGE FRANCIS STRAUB, Heidelberg, 1903

PERSONALS

DR. OSMERS is welcomed back to Maui following his recent kidney operation in town. This is his second such experience within the past six months and it is hoped recovery will be complete this time.

The U. S. Naval Medical Bulletin, January 1943, carries a symposium on Immersion Blast to which two of our local doctors, JOE PALMA and ARCHIE ECKLUND, made contributions.

DR. A. T. ROLL of Hilo gave up his practice and left for the mainland.

DR. W. D. BALFOUR of Pahala was transferred to the Maui Society, as was DR. E. A. TOMPKINS of Puumaile Home.

DR. W. F. LESLIE of Leahi Home replaced DR. TOMPKINS as Superintendent and Medical Director of Puumaile Home.

DR. R. ECKLUND succeeded DR. BALFOUR at Pahala: he was in turn replaced by DR. L. R. FERNANDEZ.

DR. R. P. WIPPERMAN, from Honolulu, is now at Naalehu, Hawaii.

The Hawaii Island Blood Plasma Bank has been reorganized under the Emergency Medical Service of the OCD, DR. C. B. BROWN directing its activities.

DR. M. L. CHANG was elected Secretary of the Hawaii Society to fill the vacancy on the resignation of DR. E. A. TOMPKINS.

Our valuable little helper—Jane Eto—who for the past two years has made up the other half of the library and general staff, left us to marry Waichi Ouye and has gone to Hakalau, Hawaii, to live. Ethel Tsutui who has been taking care of your book orders with Secretarial Service has come to take her place. She will continue to take orders for medical books.

Several films, reputed to be very good, are available for circulation—"Sulfonamide Therapy" by Long and Ravdin, "Immunization against Infectious Diseases" by McKhann, and "Pentothal Sodium."

Have you heard the broadcast of DR. RODNEY WEST's song "I Miss My Old Hawaii?" Both lyrics and music are by DR. WEST. We have copies available.

Hospital. These men would then have the financial backing and the equipment of the hospitals which they served. And then we could really have a Hawaii Society of Clinical Pathologists.

LOUIS HIRSCH, M. D.
Director of Laboratories
The Queen's Hospital.

TO PHYSICIANS OF THE CITY OF HONOLULU:

Subject: Diet Clinic

Sponsored by the Territorial Nutrition Committee

Place: The Board of Health Building.
Space has been set aside at the Waikiki end of the basement.

Time: 1:30 P.M. to 2:30 P.M. or later,
Monday through Friday.

Personnel: Members of the Hawaii Dietetic Association, all of whom are qualified dietitians or nutritionists who have volunteered their time and services.

Purpose: This clinic in no way proposes to prescribe diets to any patient. However, it does propose to try to solve some of the practical problems of buying and preparation encountered by the patients in carrying out physician's orders. In so doing, this service is attempting to save some of the busy physician's time.

Patients will be urged to report back to the physician for check.

Reports will be given to the physician of his patient's attendance.

Open to: All workers participating in the war effort with gastric disturbances who are in need of practical advice on carrying out the physician's dietary prescription.

Referral by physicians only: A diet slip from the physician should accompany each patient, with special instructions noted at the bottom of the diet slip.
No diagnosis need be given.

Diet Slips are available to all physicians upon request at the office of Mrs. Bolles, Mabel Smyth Memorial Building. These liberal diets were planned in consultation with physicians. They may be modified by the physician. These modified instructions will be used in discussing diets with patients.

Phone: For further information or if the physician wishes to give special instructions to the dietitian, phone:

Mrs. Marjorie Abel 54921, Local 234
Mrs. Elizabeth Bolles 3990

CAREY D. MILLER, Chairman
Territorial Nutrition Committee

The Bureau of Maternal and Child Health of the Board of Health announces the inauguration of a program of financial aid for certain types of medical service to the dependents of military personnel. A limited amount of funds has been allocated by the Children's Bureau for use here. The program calls for subsidizing the costs of maternity care and pediatrics, including hospital costs and a limited amount of pay to the physician for his service.

DR. SAMUEL M. WISHIK, USPHS, has been assigned to duty with the Territorial Board of Health as acting director of the Bureau of Maternal and Child Health.

From our Governor in Washington comes the welcome news that at last funds will be available for the much needed expansion of the civilian hospitals in the Territory.

It is interesting to note that OCD Director Black properly gives credit to Dr. E. A. FENNEL as having proposed the establishment of a blood bank in Honolulu in December, 1940.

DR. JOHN W. DEVEREUX was specially cited "for distinguished service to the community" by the Honolulu Junior Chamber of Commerce and was presented with a distinguished service key. The award is annually given to some young man of the community between 21 and 35, for exceptionally meritorious work for the public good.

Returning from the mainland recently were Drs. MITCHELL, HARTWELL, and GAUDIN.

The library has recently received a valuable contribution of bound journals—including A.M.A.'s and Lancet's back to 1900 and 1852, respectively, from the U. S. Public Health Service, arranged for by Dr. LINSON. Many gaps in our journal files have been filled and we are grateful indeed to Dr. LINSON for this addition.

MAJOR R. J. HOAGLAND, commanding officer of Provisional Hospital No. 3, (Kuakini Hospital) is leaving for other duty shortly. We lose an active service member who has contributed much to our Thursday morning clinics and to the JOURNAL, but particularly we want to thank him for his invaluable service to the library.

The new schedule and staff for the TUMOR CLINIC at Queen's Hospital has just been announced. Beginning March 10th the clinic will meet every two weeks at 8:15 in the nurses classroom, with nurse, social worker, secretary and staff in attendance. The clinic is set up according to the requirements of the American College of Surgeons, whose approval it has. Members of the permanent staff are Dr. Buzald, Chairman and Radiologist; Dr. Hirsch, Pathologist, and Dr. Hartwell, Medical Consultant and in charge of clinical records. A rotating staff has been appointed which will change yearly, viz: Surgeon, Dr. Strode, with Dr. Burgess as alternate; Gynecologist, Dr. Phillips with Dr. W. K. Chang as alternate; Dermatologist, Dr. Johnson with Dr. Arnold, Jr., as alternate; Otolaryngologist, Dr. Morgan with Dr. Pinkerton as alternate; G. U., Dr. Brown; Ophthalmologist, Dr. Wong with Dr. Holmes as alternate. Appointments for the clinic should be made through Dr. Hartwell.

DR. HOMER M. IZUMI, Kula sanatorium physician, was the first American of Japanese ancestry to volunteer for the army in the Paia district.

DR. A. G. HODGINS has now been twice a grandfather, his son John Stanley announcing the birth of his son at Lihue, Kauai.



The coveted Army-Navy "E" has been awarded to Abbott Laboratories for high achievement in the production of vital war supplies.



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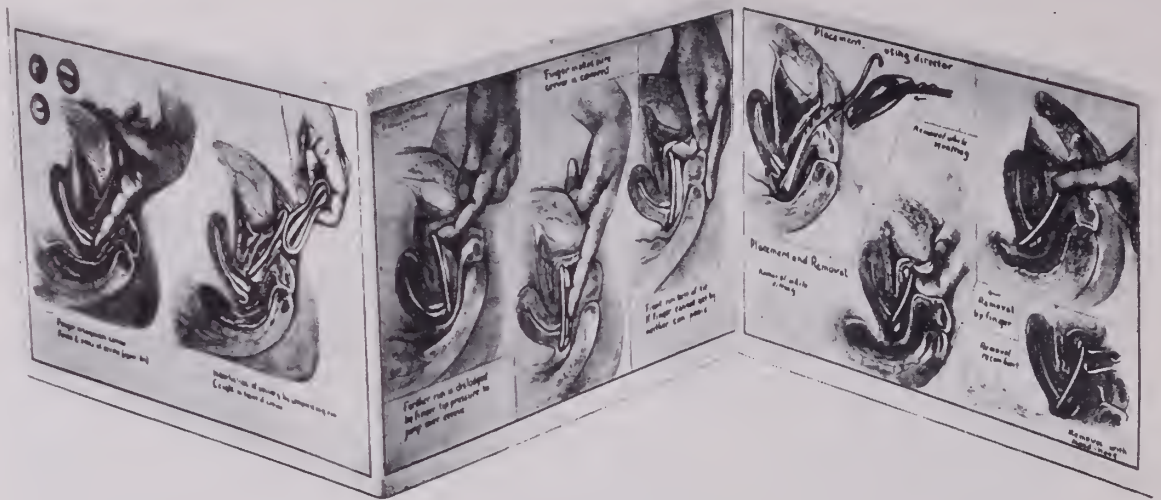
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The medical community has lost a very valuable executive in Miss Marguerite Peters. We print here in tribute to her the resolution adopted by the Honolulu Society:

RESOLUTION

Inasmuch as Miss Marguerite Peters, who from November 6, 1936 to December 31, 1942 was superintendent of the Kapiolani Maternity & Gynecological Hospital, was forced to resign and has left the Territory;

BE IT RESOLVED that the Honolulu County Society express to Miss Peters its sincere regret that it became necessary for her to resign and that the society feels that not only has the medical fraternity but the community suffered a great loss. Her untiring, brilliant work, both managerial and professional, has not only enabled the Kapiolani Maternity & Gynecological Hospital to rise from mediocrity to excellence but has greatly influenced the standards of all hospitals in the community, especially in the practice of obstetrics and gynecology;

AND BE IT FURTHER RESOLVED, that this Society expresses its confidence in the administrative and professional ability of Miss Peters, and hopes that this expression of confidence may be of comfort and service to her in the future.

DR. WAH KAI CHANG now has associated with him DR. CLARENCE CHANG, who recently finished his internship at Queen's.

DR. and MRS. HODGINS left by clipper for the mainland recently. Our sincere best wishes go with them.

The Distinguished Service Medal was awarded to BRIG. GEN. EDGAR KING, surgeon for the Hawaiian Department, on January 6th. The citation rendered with the award was as follows: "For exceptionally distinguished and meritorious service to the government in the performance of duty of great responsibilities . . . Col. King conceived and thereafter skillfully formulated a plan for the operation in war of the medical department in Hawaii, which planning was brilliantly justified by its success in battle.

"His execution of this plan was performed with such consummate skill on December 7, 1941, and succeeding days, as to save an unprecedented proportion of persons who had been wounded, and as to elicit the admiration of the medical work and bring distinction upon the Medical Department, United States Army."

President,
Honolulu County Medical Society
Honolulu, T. H.

Dear Sir:

The Nursing Council for War Service has been gratified by the concern of the Medical Association about nursing problems. We know that many of the doctors have been as worried about the shortage of nurses and their morale and welfare as we have been.

As you all know, the order freezing hospital employees to their jobs was not of our making, and we do not think that it has done much for nursing, except to add to our problems. We feel, however, that it is our duty to uphold this law, as any other, whether it meets with our approval or not. We have set up our own nursing office which aids and advises on these matters, and have vowed that we will do all in our power to prevent any nurse appearing in military court.

It has now been brought to our attention that some doctors have approached nurses who are in hospital positions, offering them better hours and salaries for office work. All doctors must be aware that nurses cannot leave their hospital positions, and they are only lowering the morale of the nurse by offering her conditions which the hospital cannot meet. We feel that adequate care of hospital patients should be as much the concern of the medical profession as of the nurses. We cannot believe that the doctor who will cause such dissatisfaction is truly interested in our problems.

It is a great satisfaction to us to see so many doctors beginning to realize the value of a registered nurse in his office. The Nursing Service Bureau has managed so far to fill all requests for office nurses, and has access to the OCD nursing files if positions cannot be filled from the registry. Using the Bureau will draw nurses from less essential sources than hospitals.

We do not think that it is too much to ask the medical profession to make an effort to bolster the sense of responsibility and service among hospital nurses, and thus help us maintain our nursing care.

Very truly yours,

(Mrs) Helen Gage, R. N., Chairman
Nursing Council for War Service

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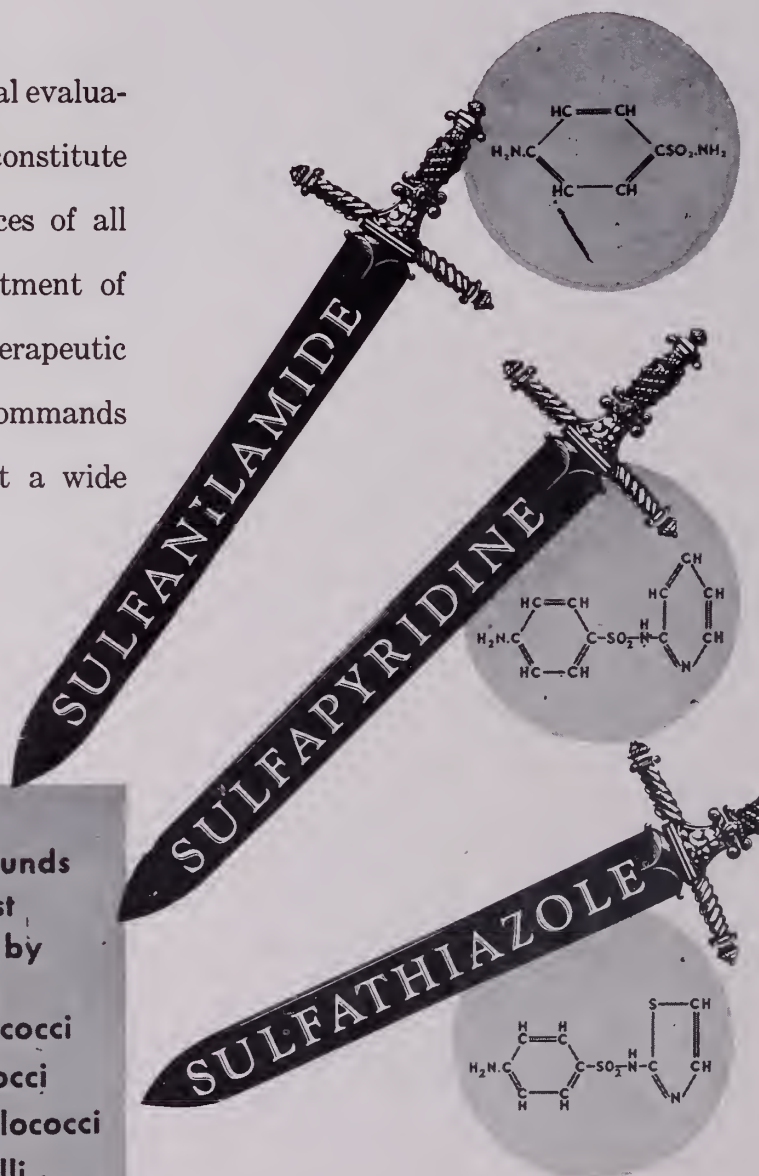
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MARCH-APRIL, 1943

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INSECTS AND OTHER ARTHROPODS OF MEDICAL INTEREST IN HAWAII

C. E. PEMBERTON

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MICHAEL GURDIN, LIEUTENANT, M. C., U. S. N. R.

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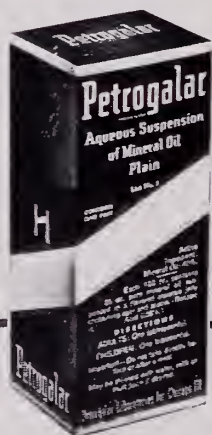
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1942 - 1943

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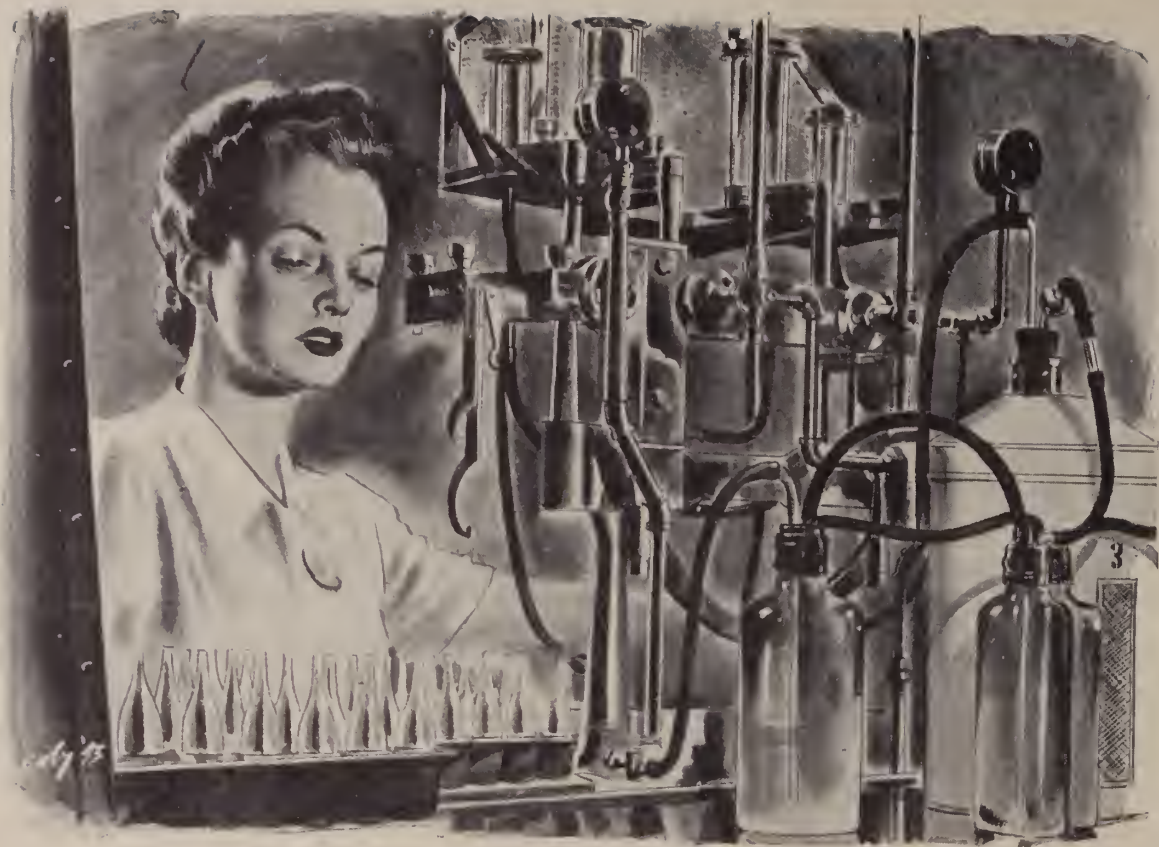


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* *Laryngoscope*, Feb. 1935, Vol. XLV, No. 2, 149-154
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Insects and Other Arthropods of Medical Interest in Hawaii

C. E. PEMBERTON*

For the convenience of physicians and others interested in medical entomology, a list of insects and their near relatives is here assembled in an attempt to bring together everything of this nature which has some bearing on public health in Hawaii.

MOSQUITOES

Culex quinquefasciatus (Say):

This mosquito flies and feeds only at night. It breeds most extensively in ground pools, ditches and ponds where top minnows or mosquito fish are not present. It is brownish in color with five dull-white bands on the abdomen. It is a vector of dengue and also of filariasis, in regions where these diseases occur.

Aedes albopictus (Skuse):

Feeds mostly during the daylight hours and is the mosquito that most commonly attacks ankles, wrists and other exposed parts of the body in and around buildings. It feeds occasionally at night and is especially numerous in rainy seasons. It breeds in clear water off the ground, such as tanks, tin cans, flower vases, tree holes, etc., containing fresh water. It is black with white bands on the legs and a white stripe running down the center of the back nearly to the abdomen. *A. albopictus* is an important vector of dengue, elsewhere than in Hawaii.

Aedes aegypti (L.):

Feeds during the daylight hours like *albopictus* and breeds in similar places, although it is seldom found far away from human habitations. It is not frequently seen. The color is dark but not so black as *albopictus*. The legs have distinct white bands and the back, or upper part of the thorax, bears a distinct white series of lines running lengthwise to form a perfect lyre-shaped diagram. This insect is the usual vector of yellow fever in countries where that disease occurs, and it also transmits dengue.

No other mosquitoes are known in Hawaii and fortunately species of *Anopheles* (vectors of malaria) have never become established in the Islands, although trans-oceanic airplanes are bringing them here with increasing frequency. Spray treatment of the planes is preventing the arrival of these dangerous insects in a living condition.

FLEAS

Pulex irritans (L.) (Human flea):

Normal hosts for this flea are dogs, cats, hogs,

*Entomologist, Experiment Station, Hawaiian Sugar Planters' Association.

and man. It occurs on rats and the mongoose in Hawaii but is not common on these animals. To man its bite is sharp and painful, usually leaving a reddish blotch. A dark-red flea.

Xenopsylla cheopis (Roths.) (Oriental rat flea):

This is most commonly found on rats living close to human habitations in Hawaii, although it may be taken on rats anywhere in the Islands. It is found only rarely on the mongoose and mice and has not been recorded from dogs or cats in Hawaii, although considerable search has been made for it on these animals. Being a vector of both bubonic plague and endemic typhus, it is one of Hawaii's most dangerous insects. A yellow flea.

Xenopsylla hawaiiensis (Jordan) (The Hawaiian rat flea):

Superficially this flea bears a close resemblance to *X. cheopis*. It is almost certainly a vector of bubonic plague and probably of endemic typhus as well. Eskey** determined that it occurs almost exclusively on field rats living well away from buildings and that the larvae seem to require green grass in the rat's nest for development. This flea has not been found on rats in Honolulu.

Nosopsyllus fasciatus (Bosc.) (European rat flea):

Dr. C. R. Eskey¹ was the first to record this rat flea in Hawaii. It was found only on the islands of Maui and Hawaii mostly between 1200 and 2500 feet elevation. It was on rats occurring in or near buildings. It was rare on the mongoose and mice. This flea is a known vector of bubonic plague.

Ctenocephalides felis (Bouche) (Cat flea):

This is the commonest flea in Hawaii. It is the species always seen on dogs and cats and often develops in basements and under houses in the dry seasons in Hawaii to epidemic proportions. It is often numerous on the mongoose, but is rarely taken on rats and mice. From its blackish color alone, it can be readily distinguished from the two yellowish species of *Xenopsylla* on rats. The true dog flea *Ctenocephalides canis* (Curtis), although frequently introduced on imported dogs, does not seem to survive in Hawaii and is not known to be established.

Ctenopsyllus segnis (Schonherr) (House flea):

**Eskey, C. R., 1934. Epidemiological Study of Plague in the Hawaiian Islands. Public Health Bulletin No. 213, U. S. Treasury Dept., Public Health Service.

Occurs on rats and mice and rarely on the mongoose. To date it has been found only on the islands of Maui and Hawaii. It has vestigial eyes and is undoubtedly blind. It is not known to bite man, but is a blood sucker and fully capable of doing so.

Echidnophaga gallinacea (Westwood) (Chicken or Sticktight flea):

This is a pest of chickens and also occurs commonly on rats and the mongoose. It prevails near habitations where chickens are kept. It is a very small, black insect with compressed thoracic segments and long, prominent, biting mouthparts, with which it becomes attached to the host and moves about very little. Hundreds have been tightly attached around the mouth and nose and on the ears of rats living near chicken pens. It also gets on dogs rather commonly and in other countries has been collected from several different animals.

Although the rat fleas are the most dangerous to man in Hawaii, all of the other species should be looked upon with suspicion as potential vectors of rat-borne diseases, since they occur on rats and are capable of biting human beings.

The chicken flea closely resembles the Chigoe flea *Tunga penetrans* (L.), known as the "jigger" or "sand flea" in countries where it occurs. Fortunately "jiggers" do not occur in Hawaii. They have the annoying habit of burrowing into the skin, especially between the toes, causing ulcers.

BEDBUG

The cosmopolitan bedbug *Cimex lectularius* (L.) is no respecter of persons or places. It has been in Hawaii a long time and has become particularly noticeable in Honolulu in recent years following the large, temporary increase in population. Persons bitten by bedbugs are variously affected. In susceptible individuals the bite causes considerable swelling and irritation.

CONE-NOSE OR "KISSING BUG"

An uncommon bug *Triatoma rubrofasciata* (De Geer), which is occasionally seen in Honolulu, may inflict a painful bite if touched. It was once seen in Kaimuki in large numbers in an old lumber pile. It resembles the bedbug superficially though measures fully seven-eighths of an inch in length and can fly readily. It is black with reddish markings. Other species of *Triatoma* in California, Mexico and South America are of definite medical importance. In the latter two countries these insects are known to transmit trypanosomiasis to man.

ANTS, BEES, AND WASPS

Solenopsis geminata (Fab.) (The fire ant):

The fire ant is a small yellowish-to-red ant that usually nests in the ground under stones, etc., generally in regions of light rainfall. Upon touching the nests these ants swarm over the hands, feet or legs and immediately inflict sharp, painful stings. The sting is of short duration with no after effects.

Apis mellifera (L.) (Honey bee):

Only temporary pain and swelling usually result from the sting of a honey bee. Barefoot children are commonly stung on the feet by honey bees on lawns. It is hardly necessary to mention that individuals unaccustomed to bee stings may be seriously affected by a large number of stings received simultaneously.

Vespa occidentalis (Cress.) (Hornet):

This hornet nests in the ground and is only known on the islands of Kauai and Oahu. It occurs almost solely in the uplands. It is rather pugnacious when alarmed and will inflict painful stings. It is black and yellow.

Polistes species. (Builders of parchment nests):

The three species of *Polistes* wasps in Hawaii are familiar to most residents. They build parchment nests of many cells under eaves of houses, in bushes, etc. They have the habit of assembling together in masses indoors or in protected spots every winter. When disturbed they may sting without further provocation. Apart from the pain and swelling no serious consequences have come to our notice.

Bethylidae:

There are several species of small, mostly wingless, ant-like insects in Hawaii which occasionally get into clothing or in beds and sting upon contact. The sting is sharp and may be repeated several times. It is followed by welts of varying proportions, depending upon the individual stung. *Holepyrus hawaiiensis* (Ashmead) is especially common around buildings where stored, unpackaged foods are kept. Residents have often complained of the sting but, owing to the small size of the insect and its secretive habits it was not noticed. Minute wasps of the genus *Schlerodermus* in Hawaii have similar habits.

FLIES

Stomoxys calcitrans (L.) (Stable Fly):

The stable fly bears some resemblance to the common house fly and is usually described as a vicious biter. It will fill with blood very quickly if not disturbed. It is common in Hawaii and oc-

casionally annoys bathers at Waikiki. One easy way to distinguish it from the house fly is by its bayonet-like probosis projecting in front of the head.

Musca domestica (L.) (The house fly):

Sarcophaga species:

Lucilia species:

Synthesiomyia species:

These flies and a few others can be carriers of disease because they often have access to human foods and are also commonly attracted either to human and other excrement or decaying meats, fish and dead animals. It is common knowledge that they readily fly from contaminated material to clean foods with their feet, mouthparts and intestinal tracts teeming with organisms present in putrefying substances.

COCKROACHES

Cockroaches contaminate human foods with their excrement and from the habit of disgorging parts of their food. Since some species visit and obtain food both in our homes, stores and warehouses, as well as the vilest of places such as sewers, they may be considered dangerous to human health. Of the 16 species of roaches in Hawaii, the three that are probably the most frequently met with in houses are the large reddish roach *Periplaneta americana* (L.), the Australian roach *Periplaneta australasiae* (Fabr.), which is a little smaller with white shoulder marks, and the German roach *Blatella germanica* (L.), a small, active, gray species.

CENTIPEDE

There are several kinds of centipedes in Hawaii but only one (*Scolopendra subspinipes* [Leach]) bites man. The young of this species are small and greenish in color, so unlike their large brown parents that they are often believed by the uninformed to be another kind. The bite of this centipede is painful and with persons susceptible to the poison, severe swelling follows and remains for several days. The bite is made by the first pair of legs, each of which is terminated by a powerful claw through which poison is ejected from a large poison gland at the base. The bite is easily diagnosed by the presence of two reddish spots where each claw has penetrated the skin.

SCORPION

One species of scorpion (*Isometrus maculatus* [De Geer]) is commonly seen in Hawaii under boards,

rocks, concealed in folded towels, etc. It is not pugnacious and its sting, though mildly painful and poisonous, is rarely reported.

TICKS, SPIDERS AND MITES

The brown dog tick, *Rhipicephalus sanguineus* (Latr.), is well known as a vector of malignant jaundice of dogs and is commonly seen in houses in Hawaii where dogs are allowed indoors. It can and does bite man, although we do not often hear of it. It transmits a rickettsial disease of man in Mediterranean countries, known as fievre boutonneuse.

Latrodectus mactans (Fabr.) (Black Widow Spider):

This spider has been in Hawaii since at least 1925 and is now spread over most of the Territory, excepting the island of Kauai. It occurs mostly where the rainfall is light. The result from its bite may be serious but cases are rare in Hawaii. The bite is not usually painful at first but grows in intensity for several hours thereafter. *Latrodectus geometricus* (Koch.) a closely related spider but not so black and with brownish-banded legs, was discovered in many parts of Honolulu during 1939. It has the typical reddish hourglass marking on the under side of the abdomen, similar to that on the true Black Widow Spider. The mandibles are small and although the bite is undoubtedly poisonous this spider does not have the bad record of the Black Widow.

There is no reason to believe that the bite of the Black Widow Spider is less dangerous in Hawaii than elsewhere, although to date no fatalities have been recorded from its bite in the Islands.

Pediculoides ventricosus (Newport):

This is a minute louse-like mite which normally feeds on certain insects. Occasionally it multiplies where insects are attacking stored grains and other foods and will swarm over persons handling the material, causing an acute, itching dermatitis.

Dermanyssus gallinae (De Geer) (poultry mite):

Though primarily a serious pest of poultry, this minute gray mite also bites man and sometimes causes irritation to the hands and arms of men handling poultry. Another mite tentatively identified as a species of *Dermanyssus* occurs on birds in Hawaii and sometimes becomes excessively numerous in the nests. When nests are built under the eaves of houses the mites crawl into nearby windows and doors and cause much irritation and occasional skin rashes on people sleeping near these nests.

Laelaps echidninus (Ber) (rat mites):

Laelaps hawaiiensis (Ewing):

Two active, blood-sucking mites are common on rats in Hawaii. We have no record of their biting man in Hawaii; but they are nearly always full of blood when seen on rats and are fully capable of biting man.

Tyroglyphidae:

One species of so called "Sugar Mite" occurs in flour, dried fruits, etc. It was recently found in

quantity in some packaged cereal meal and powdered dog food. The mites are almost microscopic in size and will cause a mild dermatitis if such infested material is handled.

Fortunately redbugs or "Chiggers" do not occur in Hawaii. These mites (*Trombididae*), when young, attach themselves to the skin and cause a severe irritation and itching.

The Sucking Lice:

Both the human head louse *Pediculus humanus capitis* (De Geer) and the pubic louse *Phthirus pubis* (L.) occur in Hawaii.



Primary Atypical Pneumonia

H. J. FRACHTMAN, M.D.

Major, Medical Corps, A.U.S.

The disease complex which we have chosen to call primary atypical pneumonia is of considerable interest to the medical newcomer in these islands. Another name which would aptly describe the condition is acute interstitial pneumonitis. A common term is oahu pneumonia.

My first introduction to it was during the winter of 1940-1941 in the gulf coast area of the mainland, but the disease was not prevalent enough to permit any comprehensive study. There we were more accustomed to the usual lobar and lobular pneumonias. During the past several months we have had the opportunity to study many of these cases, to follow their course with frequent x-rays, and to observe the efficacy of various forms of treatment.

CLINICAL COURSE

The onset of atypical pneumonia is usually gradual, over a period of three or four days, but may be quite abrupt. Headache, which may be very severe, malaise, and chilly sensations are frequently the first symptoms noted. A non-productive cough appears very soon or may be present from the onset. The cough becomes progressively worse; in most cases it is the leading symptom and the most common cause for admission. Sore throat and nasal discharge may be concomitant symptoms, but are not necessarily present. Pain in the chest and back are commonly complained of. The absence of sputum in most cases is noteworthy. In the few cases that have produced sputum, it has been mucoid or mucopurulent, never bloody or rusty. The temperature may rise as high as 104 or 105 F., but fever of this degree is not maintained long. Cyanosis has been noted in severe cases.

We have studied the temperature curves and find that there is no definite pattern. It may demonstrate an abrupt fall from high levels in twenty-four to thirty-six hours; it may be a low grade fever of the continuous type, lasting several days. One or two of our cases have come in with temperature elevations of less than a degree, but with extensive pulmonary infiltration.

The hematologic findings are likewise incon-

sistent. The red cell count is not affected, and the white cell count may be either entirely normal or elevated, with a shift to the left.

It has been found that the x-ray appearance of the lesion and the physical findings are not well correlated. In ordinary pneumonias we expect the impaired resonance, the bronchial breathing, the fine moist rales, and the increased fremitus to indicate the extent of the lesion and the x-ray confirms these findings. One cannot expect this in atypical pneumonia. Minimal physical findings, such as slightly diminished breath sounds or a few scattered moist rales, may be found in cases where an entire lobe has been densely infiltrated. The x-ray may show infiltration from the hilum toward the periphery, or present a diffuse patchy appearance. The lesion may be unilateral or bilateral, and may involve one or more lobes, but, as a rule only one lobe is involved.

PATHOLOGY

The pathology of the disease is not completely known. It appears to be an infiltrative process, probably a peribronchiolar infiltration. There is not the consolidation which occurs in lobar and lobular pneumonias. The rapid clearing of some of these lesions substantiates this point.

Furthermore, the cause of the disease is unknown. Wherever possible the sputum has been studied bacteriologically, but without successfully identifying any specific organism. It is quite likely that a virus is the offender.

The contagiousness of this type of pneumonia is minimal. It is not known definitely whether one attack confers immunity, but during the time that we have observed the disease, we have had no patient admitted with a recurrence.

DIFFERENTIAL DIAGNOSIS

Several diseases must be considered in the differential diagnosis:

Influenza: In influenza, prostration is greater; marked injection of the conjunctivae and nasopharynx is usually present; leukopenia is characteristic; there are no physical or x-ray signs of pneumonia, unless influenzal pneumonia supervenes.

Approved for publication. The views expressed are those of the author, and are not to be construed as official or as reflecting those of the War Department.



Fig. 1. Case L. S. Radiograph of chest admission.



Fig. 2. Case L. S. Radiograph of chest seven days after admission. Febrile reaction for first three days; temperature normal thereafter



Fig. 3. Case L. S. Radiograph of chest nineteen days after admission.



Fig. 4. Case H. M. Radiograph of chest on admission.



Fig. 5. Case H. M. Radiograph of chest thirteen days after admission. Febrile reaction for first six days; temperature normal thereafter.



Fig. 6. Case A. C. Radiograph of chest on admission. Note location of pneumonic process in right upper lobe.



Fig. 7. Case A. C. Radiograph of chest twenty days after admission. Febrile reaction for first six days; temperature normal thereafter.

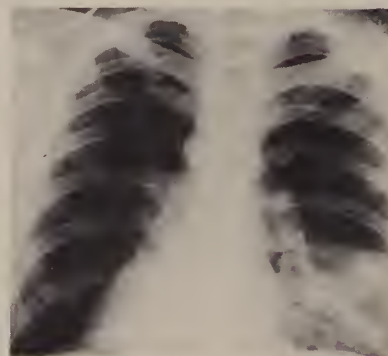


Fig. 8. Case R. W. Radiograph of chest on admission.

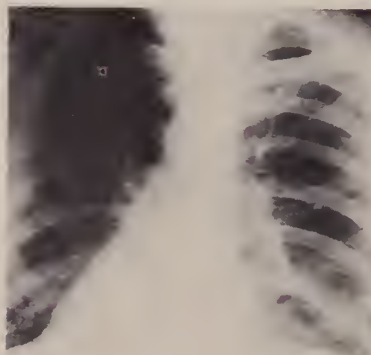


Fig. 9. Case R. W. Radiograph of chest fifty-three days after admission. Febrile reaction for first nine days; temperature normal thereafter.

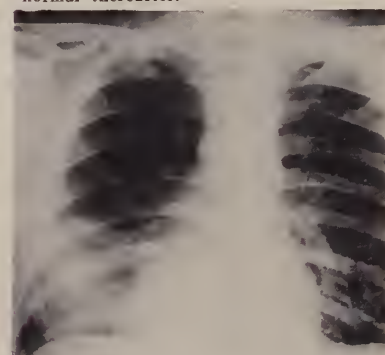


Fig. 10. Case F. V. Radiograph of chest on admission.

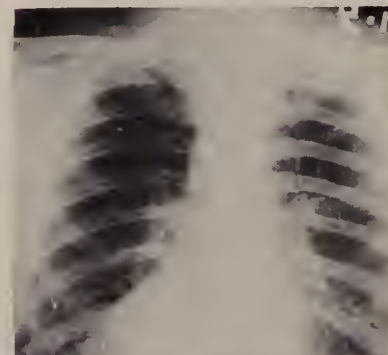


Fig. 11. Case F. V. Radiograph of chest twenty-six days after admission. This patient had a temperature of 99 F. on the morning of his second hospital day; during the rest of his stay in the hospital, his temperature was not normal.

Bronchitis: An x-ray of the chest is usually necessary to make the differentiation. The borderline between the two conditions is not very sharply defined, however, either clinically or roentgenologically.

Lobar and lobular pneumonia: Pulse and respiratory rates are more elevated; the white blood count is higher; the sputum is more profuse and may be of a different type, for example, the rusty sputum of lobar pneumonia; the physical findings and the x-ray findings correspond more closely; the bacteria can be found in the sputum; the response to the sulfonamides is more marked.

Pulmonary tuberculosis: At times the roentgenographic appearance of the lesions of atypical pneumonia simulate those of tuberculosis. Serial x-ray studies, the presence of tubercle bacilli in the sputum, and the clinical course will distinguish between the two conditions.

Psittacosis, Q fever, and pulmonary coccidiomycosis may be confused, but they are uncommon and the isolation of the infectious agent or the appropriate immunological reactions will distinguish them from atypical pneumonia.

PROGNOSIS

The prognosis is good, and in our series of cases there have been no fatalities. Unfortunately, military regulations prohibit the disclosure of the number of cases in our series. There are no clear-cut complications. We have seen no complicating pleural effusion or empyema. Even though the mortality is nil, the morbidity is considerable. Morbidity is especially important in military medicine. Some of our patients have required hospitalization of more than thirty days; one patient was hospitalized for over sixty days. The average period of hospitalization was from three to three and one-half weeks. To be discharged, a patient must not only be free of fever, but his lung fields must present normal x-ray findings. The latter may be difficult to attain. In civilian practice, where the patient may do lighter work than usual or work only part-time, this may not be so important. In military practice the patient must be capable of full duty when he is discharged from the

hospital. Such lesions therefore must be completely cleared. Perhaps this accounts in part for the absence of recurrence and relapse.

TREATMENT

We have used various sulfonamide preparations—sulfanilamide, sulfapyridine, sulfathiazole, and sulfadiazine—and are doubtful as to their efficacy. At the present time, we use them only if the patient is unusually toxemic or if the temperature is excessively high. We have found that such cases seem to do slightly better when sulfonamides are given; in the average case, the course of the disease is not changed.

Symptomatic and supportive treatment give good results. Headache and pain are controlled by analgesics. Cough is alleviated by cough mixtures containing expectorants and small doses of codeine. Fluids should be forced; liquid or soft diet is given during the acute phase; sedation may be necessary.

When cyanosis is present, oxygen given with a BLB mask, a few minutes each hour, has given excellent results.

If sulfonamides are used, they should be given in the same way as in the ordinary type of pneumonia, that is, 4 grams on admission and 1 gram every four hours, day and night.

SUMMARY

1. Primary atypical pneumonia is frequently encountered among the military personnel in this area.
2. The usual clinical findings are cough, headache, muscular aches, chilly sensations, fever, and variable chest findings.
3. An x-ray of the chest is necessary for accurate diagnosis.
4. The mortality is negligible, but the morbidity is high, making the disease an important problem.
5. Treatment is essentially symptomatic, but in a few selected cases, sulfonamides may be used.

Primary Atypical Pneumonia in Hawaii

ALBERT G. BOWER

Commander, M.C.-V. (S), U.S.N.R.

For the past two winters in the Naval Hospital at Pearl Harbor, we have been seeing a bizarre group of atypical pneumonias, quite different in clinical aspects and course from the customary lobar and broncho-pneumonias, and from influenza complicated by pneumonia.

The majority of cases occur in the age group 20 to 30. The onset is typically very insidious, the early symptoms being mild and consisting of vague headache, anorexia, malaise, and lumbar backache with some degree of aching in the extremities, particularly the legs. Asthenia and languor are noted by the second or third day, and chilliness is present in over half the cases by the third or fourth day. Cough is often delayed in appearance. In many instances severe, intractable frontal headache lasting several days is the chief complaint. In some instances, the onset is with a true chill, and in these, roentgenograms taken immediately show consolidation or other abnormalities in practically every case. In a very few instances joint pains occur concomitantly with the generalized muscular aching. These patients are usually much depressed.

Greenish or white mucopurulent material is usually raised on coughing by the third or fourth day, but in only two instances have we seen rusty sputum, and blood-tinged sputum has been absent.

Fever usually is not high. It varies widely in each twenty-four-hour period, being highest as a rule on admission and in the mornings, tending toward normal by evening. At times the pulse rate has been very high, but as a rule it is lower than expected for the degree of fever present. In the prodromal stage, fever is usually low (99 to 100 F.)

Positive physical findings consistently lag far behind those obtained with x-ray. In some very sick individuals, the roentgenographic changes are pronounced, but so central that no slightest adventitious findings are present upon physical examination. Again, merely suppressed breath sounds, impaired resonance, or a few fine, crackling rales which disappear on coughing may be heard. In most of the

severer cases, true tubular or bronchial breathing is heard, and this tends to reach its fastigium when the tendency of the fever is to disappear. Asthenia tends to be prolonged during convalescence in these severer cases.

In over half our cases the white blood count was under 7,000, and in those showing 10 to 11 thousand, the tendency was to drop to normal or lower upon adequate hydration. The picture is bizarre. While a large percentage showed a normal neutrophile count, large monocyte counts of 8 to 17 were not unusual, though lymphocytes were seldom increased. Anemia was conspicuous by its absence. Leukopenias to 4,000 were noted. Pneumococci were very rarely present, and in only two instances were they type-specific when found.

There were no characteristic x-ray findings. These varied from minor patchy infiltrations to the picture of a true lobar pneumonia. In the most severe cases the widespread, floccular, "snowflake" appearance of the lobar shadows persisted sometimes for weeks following defervescence and abeyance of symptoms.

The differential diagnosis is comparatively easy after a number of these atypical cases have been seen, but one must always be on guard against missing some of the other communicable diseases giving normal or diminished white counts, chills, low pulse-fever ratios, and bronchitis or pneumonia. Typhoid is not so much to be feared, because of its extremely low incidence in the Naval service through immunization. Influenza, brucellosis, and malaria are to be considered.

The etiology is undetermined. Treatment is entirely supportive and symptomatic; with the exception of those cases secondarily infected with pyogenic cocci, as evidenced by a high white count, sulfa-drugs are entirely useless, and may add to the burden of the patient's defense. In the few very critical cases, oxygen has been helpful, and we believe they have been made more comfortable and the duration shortened through the intramuscular injection of 10 grains (0.65 gm.) of camphor every eight hours. This tends to increase the ventilation of the lungs and affords general support to the circulatory system.

*U.S. Naval Hospital, Aiea Heights, Pearl Harbor.

Approved for publication. The views expressed are those of the author, and are not to be construed as official or as reflecting those of the War Department.

Special Considerations in the Repair of Facial Injuries

MICHAEL GURDIN, M.D.

Lieutenant, M. C., U.S.N.R.

That "A man's face is his fortune" may not be entirely true, but there can be no denying that a disfigured face is a catastrophe in any station of life. Exposure renders the face susceptible to trauma more often than any other part of the body, except the extremities, and every doctor, irrespective of his specialty, is called upon to treat facial injuries

Aside from the usual considerations of preservation of life and function, the prevention of disfigurement must play an inordinately important part in the treatment of injuries of the face if these patients are to return to a normal social, economic and psychological life. The attainment of this important objective calls for the application of the finest surgical judgment and the employment of accurate surgical technique.

The ultimate aim is *primary union* of the injured tissues. In many cases primary union will eliminate the necessity of secondary repair; in the others it will minimize secondary repair and facilitate the final result. In those cases requiring secondary repair we can facilitate this repair by (1) preventing infection; (2) preserving all vital tissue; (3) preventing stitch marks; and (4) avoiding badly placed scars in debridement or relaxation incisions.

DIAGNOSIS

Every injured patient is entitled to a thorough physical examination. All injuries, of course, are treated in relation to their seriousness and urgency, shock and intracranial injury being of primary consideration. Fracture of the facial bones must be diagnosed and properly treated. It is well to remember that these fractures are not ordinarily seen in routine skull roentgenograms; it is wiser to suspect them from physical signs, confirming these suspicions by x-rays of the special bones involved. The following physical signs should be looked for:

- Assymetry of the palpebral fissures
- Echymosis of the eyelids
- Infra-orbital anesthesia
- Assymetry of the cheek prominences
- Nasal deformity
- Malocclusion of the teeth.
- Diplopia

PREPARATION FOR SURGERY

Having uppermost in mind the prevention of infection, the surgeon should observe strictest aseptic precautions. Emergency bandages are removed

from the wounds and active bleeders picked up with sterile mosquito forceps, being careful to clamp only the vessel. General anesthesia is rarely needed, but if it is, intravenous sodium pentothal is preferred. The area surrounding the wound is shaved and cleansed with a mild white soap and sterile water. Hydrogen peroxide is useful in removing dried blood; ether or carbon tetrachloride will facilitate the removal of grease. Imbedded dirt and road grime must be completely removed to prevent tattooing and a permanent "dirty face." Ordinarily these particles can be picked out or washed off with a fat solvent but occasionally it is necessary to use a rather stiff scrubbing brush. This procedure will traumatize the area but since the skin is already abraded, a deeper abrasion is preferable to a permanent discoloration. Tincture of green soap or a chemical antiseptic should never be poured into an open wound of the face.

SURGICAL REPAIR

Debridement in facial injuries must be extremely conservative. A few millimeters of tissue lost from the tip of the nose, the rim of the ear, the angle of the mouth, or the canthus of the eye, may mean painful and costly subsequent repair, permanent disfigurement, or both. Not one millimeter of potentially viable tissue should be sacrificed at the primary repair. Doubtful tissue should be treated as viable and every attempt made to conserve it by warm packs, supportive dressings and the avoidance of further traumatization by sutures. We have often been pleasantly surprised by the healthy appearance of a flap which twelve hours before had been of very doubtful viability.

Frankly macerated and devitalized tissue should, of course, be debrided. A razor-edge knife should be used; skin should never be "clipped" with scissors. "Flap" or "tongue" lacerations should be loosely sutured to the periphery of the wound to prevent retraction and then treated with a pressure bandage in the manner of a free skin transplant.

The slogan of every doctor with a needle and thread in his hand doing facial repair should be *approximation without strangulation*. Suturing must be atraumatic and accurate. These two ideals cannot be accomplished by using abdominal or orthopedic instruments, nor can such a closure be accomplished on the face by the use of skin clips. Ordinarily we do not care to chance burying non-absorbable tissue in a traumatic wound, but use

Approved for publication. The views expressed are those of the author and are not to be construed as official or as reflecting those of the Navy Department.

000 plain catgut, both for tying bleeders and for subcutaneous approximation of tissue. In the skin a very fine silk, dermal, or horsehair suture is used on an atraumatic cutting needle. The wound edges are picked up with skin hooks (made by bending a No. 6 dental explorer) and are not traumatized by crushing with thumb forceps. Wound edges are never approximated under tension. If proper relaxation cannot be obtained by undermining the wound edges, the raw area is covered either by a sliding flap from the vicinity of the wound or a free graft at the time of primary repair. Often the proper application of a graft about a centimeter in diameter makes the difference between a good repair and a permanent deformity.

In our experience sulfanilamide or sulfathiazole powder dusted into wounds of the face definitely delays healing and predisposes to serum formation, but these mild complications are infinitely to be preferred to infection and should be risked if mechanical sterilization of the wound is doubtful. Tetanus or tetanus-gas bacillus antitoxin is used when indicated.

DRESSINGS AND BANDAGING

Dressings must be purposeful, never routine. A properly applied dressing is comforting to the patient, not irritating. Dressings must protect the fresh wound from trauma and infection, prevent postoperative hematoma, and promote rest for the wound and surrounding tissues. If these objectives cannot be accomplished, as in wounds of the lips, dressings should be eliminated altogether, keeping the fresh wounds clean with peroxide swabs and coated with sterile vaseline.

Physiologic rest is an essential factor in proper healing. To accomplish this, a head bandage is used, laughing and talking are avoided, and a liquid diet taken through a straw is prescribed to avoid chewing. The eyelids, if seriously injured, are put at rest by suturing the upper and lower lids together and covering with a snug eye-pad. In the placement of all head bandages, and in ear injuries especially, care should be taken to prevent too much pressure on the ear. In bandaging the lacerated external ear, after the wound is covered with sterile vaseline gauze, the space between the posterior surface of the ear and the head is filled with cotton wadding cut to fit. The anterior surface of the ear is accurately filled with cotton pledgets, wrung out in saline and packed into the folds. This layer is covered with cotton wadding and gauze fluffs and secured by a head bandage. This method effectively "splints" the external ear and promotes healing.

POST-OPERATIVE CARE

Sulfa drugs are given postoperatively when in-

dicated. In clean wounds all skin sutures are removed after forty-eight to seventy-two hours. All sutures must be removed in ninety-six hours if stitch marks are to be avoided. Wound edges are then supported by adhesive strips. Localized serum collections in the wound are evacuated and warm compresses are employed when indicated.

In care after healing has occurred, a great opportunity is presented for turning an average result into a superior one, with a resultant extremely grateful patient. We have seen poor final results and dissatisfied patients because these patients were discharged as soon as wound healing had occurred. Remember, not only the patient, but his family and friends also see the fresh scars and comment on them, often disparagingly. During this state of healing the patient wants to feel that everything possible is being done for him.

In moveable areas we like to support the wound edges with adhesive and relieve tension for about six weeks after the stitches have been removed. Any scar which shows a tendency toward thickening or keloid formation is promptly treated by x-ray or radium. Residual subcutaneous induration is treated by daily warm packs followed by massage. Although supervised, this latter therapy is administered by the patient at home.

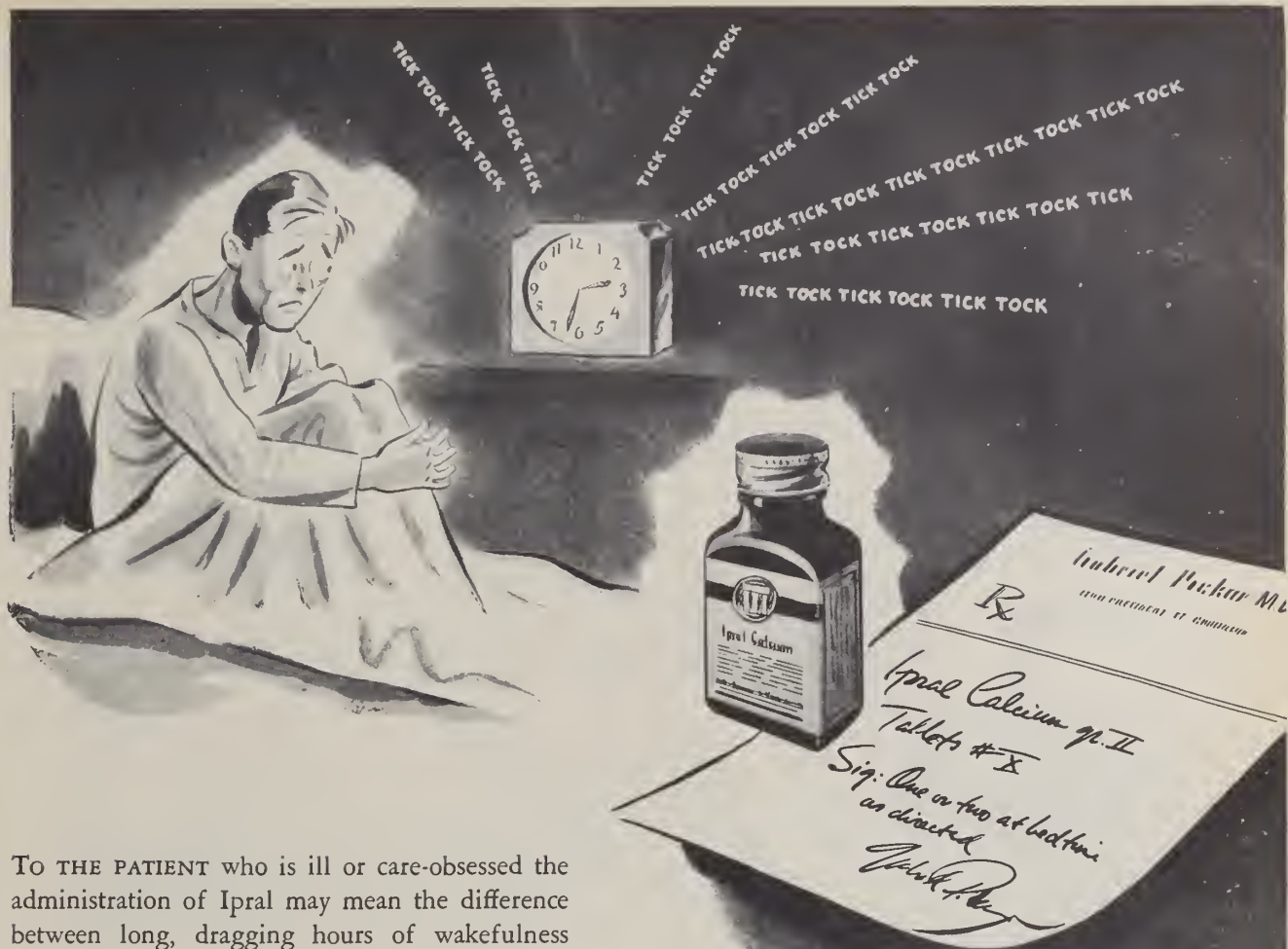
SECONDARY REPAIR

Seldom is a primary repair so successful, or so poor, that no secondary improvement is possible. In cases where secondary repair is frankly indicated it is the physician's responsibility to suggest it. In borderline cases a good indication is the patient's attitude; for he will ordinarily ask if further improvement is possible. In such cases the patient should certainly have the benefit of further surgery if at all possible. Should the attending physician consider further treatment inadvisable, this responsibility should be shared by consultation. Here the suggestion of future care is more heartening than a flat denial.

Secondary repair can ordinarily be undertaken in six to nine months after primary healing. In infected cases, repair should not be undertaken in less than twelve months after complete healing.

SUMMARY

1. The cosmetic result is extremely important in facial injuries.
2. Avoid stitch marks and secondary scars.
3. Debridement must be conservative.
4. Dirt imbedded in the skin must be removed.
5. Raw surfaces are covered at the primary repair.
6. Bandaging must be purposeful.
7. Post-operative care should be diligent.
8. Secondary repair is advised when indicated.



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EDITORIALS

POLITICS VERSUS HEALTH?

When a law affecting the public health is proposed to the Legislature, a fair question and one deserving of a frank and honest answer would be: Will the changes proposed by this measure benefit the health of the community?

Senate Bill No. 92, passed by the 1943 Territorial Legislature, signed by the governor, and now a law of the territory, proposed fundamental changes in the organization of the Territorial Board of Health scrapping in their entirety statutory guarantees that the Commissioner of Public Health be an individual of proper experience and educational background, and modifying the structure of the Board of Health in such a way as to make it easily susceptible to political whims and idiosyncrasies.

Yet to date, to the best knowledge of the writer, not one word or argument tending to indicate that these changes will make for better health conditions in the Territory of Hawaii has been voiced, either by the introducer of the measure or by those who voted for it. Not one improvement in public health administration is possible under the new law which was not possible or more likely of accomplishment under the provisions of the law which was discarded; but under the new law there are potent possibilities for deterioration in public health matters against which the old law provided definite safeguards.

The essential changes in the law have to do, first with the appointment of and the qualifications prescribed for the Commissioner of Health (who under the new law is designated as President of the Board of Health); and secondly with the manner of appointment and the terms of office of members of the Board of Health.

The repealed law provided that the Commissioner of Public Health should be appointed by the Board of Health; the new law places the power of appointment in the hands of the Governor of the Territory.

The repealed law provided:

The Territorial Commissioner of Public Health shall be qualified as follows: He shall be a duly licensed doctor of medicine of the Territory of Hawaii with the additional qualifications as listed below, or he shall be a medical doctor who shall have graduated as a doctor of public health from a recognized school of public health, both course and school being subject to the approval of the Board of Health. The appointee to the position of Commissioner of Public Health shall have had in addition no less than five years of practical experience in general public health activities. He shall have a technical or practical knowledge of sanitary science. His experience as aforesaid shall have been acquired in whole or in part by active public health work during the past ten years and in any event it shall have been the equivalent, in the opinion of the Board, to that obtained through actual full time service in an organized public health department of a community of not less than 100,000 population, or such experience shall have been acquired as a regular commissioned medical officer of the United States Public Health Service, of the United States Army, or of the United States Navy, through active service for not less than eight years, during no less than five of which said commissioned officer as aforesaid shall, in the opinion of the Board, have had a practical experience in general public health activities equivalent to full time service in an organized public health department as aforesaid. Provided that the Board may, in its discretion, accept in lieu of the foregoing requirements the certificate of the Surgeon General of the United States Public Health Service that an applicant, because of the duties performed by him to the knowledge of said Surgeon General is suitably equipped by experience and training to act as a commissioner of Public Health of the Territory of Hawaii.

Such qualifications, the most skeptical must admit, provided a reasonable guarantee that the man charged with the supervision and care of the health of the people of the territory would be a man capable of exercising such care with maximum wisdom and skill.

The law as passed eliminated all reference to qualifications, but leaves the power of selection entirely in the hands of the Governor.

To date, there appears to be a certain unanimity of opinion that Governor Stainback's appointments to public office have indicated a fundamental appreciation of merit. There is no reason to believe that he has any intention of departing from what appears at this time to be his policy in selecting men for important public office.

However, it would be naive to believe that there were not purely political considerations behind the introduction of the new law, and its easy passage by the legislators; or to assume that such political influences would not continue to be exerted in regard to appointments to or administration of the Board of Health. The present governor may be immune to such influences, but there will be other days and other governors, as there have been in the past. The repealed law was, in public health matters, some degree of insulation against such political considerations.

The defunct law provided for "staggering" of the terms of members of the Board of Health. The appointive power lay with the governor, but members' terms of office overlapped in such a way that the terms of two expired each year, and no governor in one term would ordinarily appoint a whole new board.

It is an interesting commentary on things as they are in Hawaii that this provision, passed in 1937 by the House of Representatives, and Senate, and made law by the signature of the Governor, was arbitrarily if somewhat irregularly repealed by resolution of the 1943 Senate, demanding the resignations of all members of the existing board.

The law, as amended by the 1943 legislature, provides for the appointment of the whole board by the governor for a four year term.

The bill was passed by both houses, signed by the governor, and is now a law.

So much for water that is over the dam.

Analysis of the new law and its provisions reveals nothing that need necessarily stand in the way of the appointment of a highly qualified chief health officer of the territory nor of a Board of Health, excellent in the calibre of its personnel and capable of serving well the health needs of the Territory. Perhaps it is unfortunate, but it is nevertheless fact, that the new President of the Board of Health, reviewing the temper and the actions of the 1943 legislature, would be innocent indeed if he did not recognize that it will be expedient first to study well the political implications of his policies and decisions before evaluating them purely from a standpoint of good or bad public health policy.

The factor determining whether a prospective government physician on one of the outlying islands shall be appointed is likely to be not how good he is as a doctor, or whether he resides in the district he will serve, but how friendly he may be with the senator in the district.

The law as it now stands places the entire responsibility for appointment of the President and members of the Board of Health squarely with the governor. His responsibility is complete and unequivocal.

There is nothing in the law which should prevent the governor from appointing a well-qualified man,—although if a well qualified man at this or some future time is not available in the Territory, the residence requirement laws will certainly handicap a governor in exercising a proper choice. There is much reason to believe, if the quality of Governor Stainback's previous appointments is a criterion, that the man he selects will be well qualified; also that the men whom he will name to the Board of Health will be physicians and laymen of intelligence and a high sense of civic responsibility.

If this is the case, wise and efficient functioning of the Board of Health will be assured and betterment of the public health in Hawaii will be a natural consequence.

But one fact will not be forgotten:

The law which was to keep public health matters in Hawaii out of politics is dead!

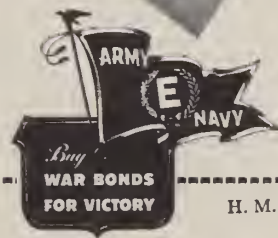


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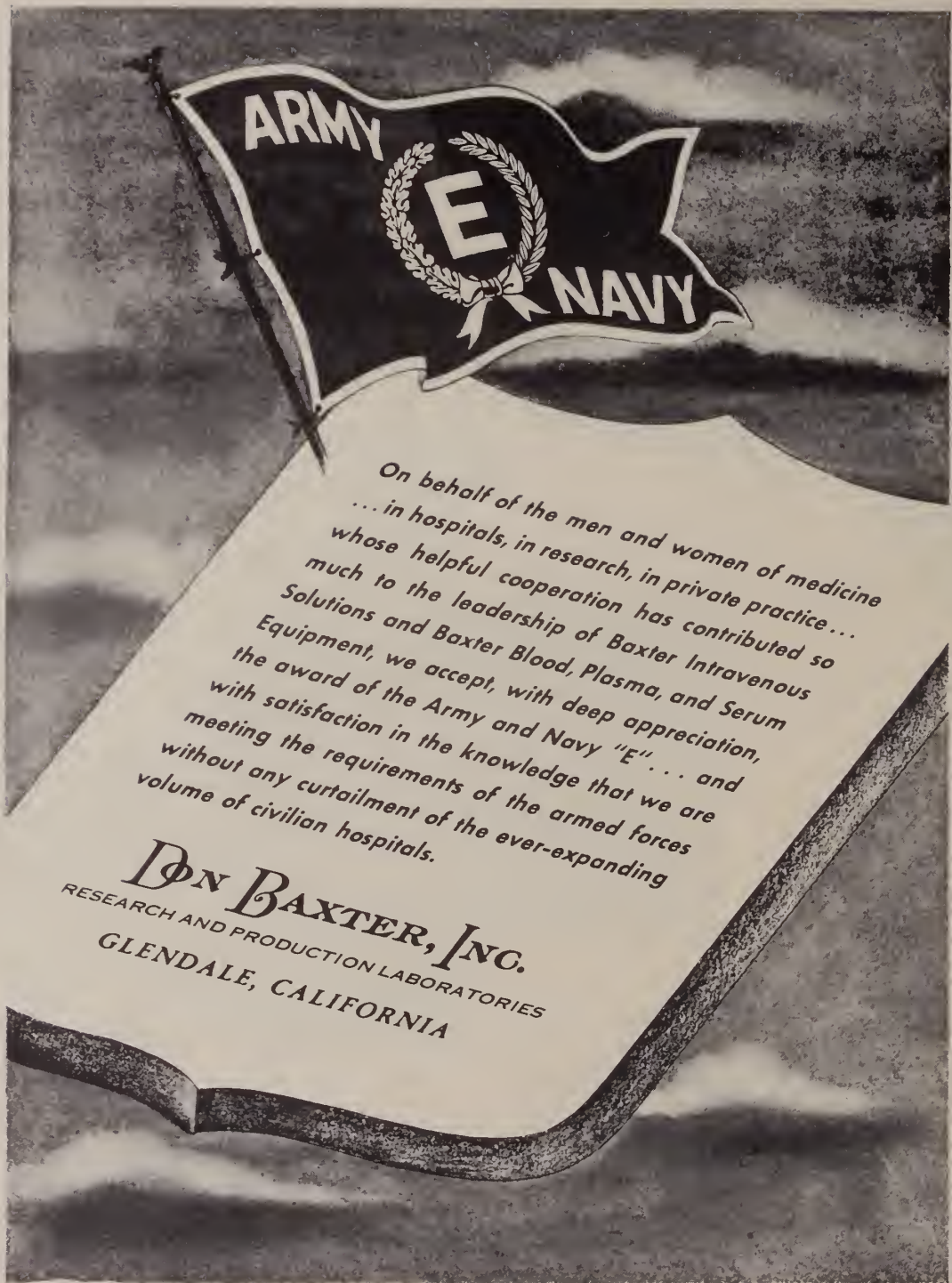
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PROGRESS IN INTERNAL MEDICINE

CORONARY ARTERY DISEASE

Clinical and Pathological Studies

A new term, coronary insufficiency, has appeared in the recent medical literature of coronary artery disease. It appears to fill an important place in its clinical classification. A number of studies of the past few years have shown that a simple classification signifying coronary arteriosclerosis with or without associated spasm (angina pectoris), and coronary artery occlusion, or thrombosis, or both, is not adequate in either a clinical or pathologic sense.

Clinical studies have shown that atypical coronary occlusion is not infrequent. Pollard and Harvill in 1940 reported 32 or 8.5 per cent of 375 cases of coronary occlusion as "painless" (Pollard, H.M., and Harvill, T.H.: Painless Coronary Occlusion, *Am. J. Med. Sci.* 199:628 [May] 1940). In these cases the outstanding symptoms were dyspnea, nausea and vomiting, dizziness or fainting, and collapse.

The occurrence of unsuspected coronary thrombosis in patients with hemiplegia is recorded by Dozzi (Dozzi, D. L.: Unsuspected Coronary Thrombosis in Patients with Hemiplegia, *Ann. Int. Med.* 12:1991 [June] 1939). Of 66 patients suffering from hemiplegia, 12 per cent had electrocardiographic evidence of coronary occlusion.

Coronary occlusion may occur in association with (perhaps initiated by) hemorrhage, shock (postoperative), or pulmonary embolism and other acute circulatory incidents. In these cases the symptoms of the associated condition may overshadow and mask the cardinal diagnostic signs of coronary infarction and so make it appear atypical.

Furthermore, clinical and pathologic studies show that the relationship of coronary occlusion to myocardial infarction is not clear-cut, as has been assumed in the past. Well marked narrowing or even complete occlusion of one or more of the major coronary arteries and their primary branches is found on pathologic examination of hearts of a considerable number of individuals who have no typical cardio-vascular signs or symptoms. This was brought out in the important clinico-pathological studies of Blumgart, et. al. (Blumgart, H. L.; Scl-

singer, M. J., and Davis, D.: Studies on the Relation of the Clinical Manifestations of Angina Pectoris, Coronary Thrombosis and Myocardial Thrombosis to the Pathological Findings, *Am. Heart J.* 19:1 [Jan.] 1940, and Blumgart, H. L.; Scllesinger, M. J., and Zoll, P. M.: Angina Pectoris, Coronary Failure and Acute Myocardial Infarction. The Role of Coronary Occlusions and Collateral Circulation, *J.A.M.A.* 116:91 [Jan. 11] 1941). They published several studies based upon a special coronary artery injection and dissection technic applied to 125 and finally to 355 hearts. The failure of coronary occlusion to cause serious myocardial damage is shown by their studies to be due to the establishment of adequate collateral circulation. Though small inter-artery communications exist in all hearts, these are inadequate for collateral circulation in case of sudden closure of normal vessels. Collateral arterioles of less than 40 microns were not found in normal hearts no matter what the age of the patient. Where there had been progressive arteriosclerosis of the coronary arteries, however, or where there had been pre-existing hypertensive or valvular heart disease with cardiac hypertrophy, the coronary inter-arterial communications were often of sufficient size to furnish adequate blood supply to parts of the myocardium whose main arterial trunks were blocked. The discrepancies between clinical diagnosis and pathologic conditions in the heart are due largely to the fact that the terms coronary thrombosis or occlusion actually refer to a pathologic event which may give rise to various clinical symptoms and signs or indeed to none (provided collateral circulation is adequate). The symptoms usually designated as being characteristic of coronary obstruction are in fact due to acute myocardial infarction.

The pathologic findings in their cases of angina pectoris support the anoxic theory of its causation. In all cases of angina pectoris in which valvular disease or arterial hypertension was absent, there was pathologic evidence of diminished blood supply, either by narrowing or by actual occlusion of one or more of the main coronary arteries.

Episodes of coronary "failure" differ from angina pectoris in the longer duration of the attack and in some instances in the altered character of the pain. The implication is that myocardial ischemia,



This interesting study of fetal circulation is taken from Antonin Bossu's *Anthropologie Etude des Organes, Fonctions, Maladies de l'Homme et de la Dame* published in Brussels in 1847.

FOR COMPLICATIONS AS OLD AS TIME

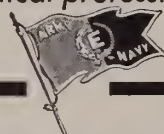
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being more prolonged, results in greater myocardial damage, necrosis and eventually fibrosis. The pathologic studies quoted above suggest that this term should have a much more extensive use than is common in the clinical classification of cases of coronary artery disease.

Classification of Coronary Artery Disease

Following the work of these authors we may then recognize three clinical grades of significant coronary artery disease and associated myocardial damage; namely, (1) angina pectoris, (2) coronary insufficiency, and (3) myocardial infarction.

Angina Pectoris

Angina pectoris is an indispensable term, partly because of long usage. Though its implications are less terrifying than formerly, because myocardial infarction is now well recognized and these cases are usually separated from the group, it usually has serious significance. It indicates relative cardiac ischemia, that is, a blood supply insufficient to meet the demands. This most frequently means coronary artery narrowing and probably spasm.

If pain occurs only with markedly increased demands, its significance may be less serious. This, for example, may be the case when it appears only after excessive muscular activity or in the presence of thyrotoxicosis, paroxysmal tachycardia or other disturbances of cardiac rhythm. In these instances the cause may be corrected and the angina controlled.

If mild activity or excitement bring on pain, or if symptoms are increasing in frequency with a decreasingly severe existing cause, or with none, the implications are much more serious. Any attacks having a duration of over fifteen to twenty minutes will probably cause some permanent myocardial damage. Such cases should usually be classified as coronary insufficiency or failure.

The abrupt onset of pain with exercise or emotion, its short duration, and its complete cessation with the institution of rest or exhibition of nitroglycerine, are important diagnostic points favoring angina. Essentially negative electrocardiographic findings are the rule. So-called coronary changes—ST depression and elevation, or T wave inversion—may be produced by exercise, but this maneuver is not recommended for routine practice because of rare mortality during the induced attack. Anoxia produced by inhalation of 10 per cent oxygen may be a safer procedure.

Coronary Insufficiency

Coronary insufficiency is differentiated from angina pectoris by the longer duration of the attack and in some instances by the altered character of the pain. The clear-cut picture of myocardial infarction does not follow. Shock is less severe; blood pressure changes are less marked; heart failure is less frequent; and fever, leucocytosis and increased red blood cell sedimentation rate are absent or much less conspicuous than in cases of myocardial infarction. Electrocardiographic changes occur, and may be the only signs of the condition. These abnormalities are usually maximal on the initial record and rarely progress as they do in cases with large myocardial infarction.

Acute episodes of coronary failure are frequently precipitated by factors which seriously reduce the coronary flow, such as prolonged tachycardia, heart failure, shock, or hemorrhage; or by factors which increase the work of the heart and its oxygen requirement, such as hypertensive crises, infection, or postoperative complications. Not infrequently the clinical features of these causal factors overshadow the event of coronary insufficiency. Its recognition then may depend only upon electrocardiographic study. One should bear the possibility in mind, particularly where cardiovascular disturbance is more severe or more prolonged than would be expected from the exciting cause. If demands on the myocardium are quickly reduced by rest, sedatives, and control of abnormal cardiac rhythm, and if circulation is restored by prompt treatment of shock or hemorrhage, extensive structural damage may be prevented.

Myocardial Infarction

Myocardial infarction usually presents a clear-cut clinical picture. The diagnosis is based upon the occurrence of prolonged precordial pain plus evidence of myocardial necrosis. Pain not infrequently has its onset during periods of rest or sleep rather than on exertion. Nitroglycerine does not relieve the pain, morphine in full doses being required for relief. Pain is usually associated with shock of varying intensity. Symptoms of cardiac insufficiency may quickly develop.

Fever, leucocytosis and increased sedimentation rate are constant signs of myocardial necrosis and may be an index of the extent of the heart damage. Friction rub occurs in from 15 to 30 per cent of cases. Electrocardiographic changes occur in a large percentage of cases, probably between 80 and 90 per cent, and this percentage may be increased by

the use of multiple chest leads. Several tracings should be taken over a period of observation to record changes.

The cause of myocardial infarction is usually acute coronary obstruction, but it may not be demonstrable pathologically, as evidenced by the studies of Blumgart. Therefore, the substitution of the term coronary obstruction for myocardial infarction is not correct. Still less correct is the use of the term coronary thrombosis to indicate myocardial infarction; for it has been found in other pathological studies that coronary obstruction is not caused by primary coronary thrombosis in the majority of instances. For instance, Horn and Finkelstein (Horn, H., and Finkelstein, L. E.: Arteriosclerosis of the Coronary Arteries and the Mechanism of Their Occlusion, *Am. Heart J.* 19:655 [June] 1940) found that intramural capillary hemorrhage into an arteriosclerotic plaque was the underlying pathologic mechanism of coronary obstruction in a larger number of cases (62.5 per cent) than primary coronary thrombosis (37.5 per cent).

Prognosis of Myocardial Infarction

Ideas regarding prognosis in myocardial infarction have also changed in recent years. The immediate mortality was previously thought to be about 50 per cent. Recent studies have shown a considerably lower mortality. This decrease is due not so much to any improvement in manner of treatment but rather to greater accuracy in diagnosis: many cases of mild infarction are now included, which previously would not have been recognized.

Rosenbaum and Levine (Rosenbaum, F. F., and Levine, S. A.: Prognostic Value of Various Clinical and Electrocardiographic Features of Acute Myocardial Infarction: Immediate Prognosis, *Arch. Int. Med.* 68:913 [Nov.] 1941) published a study of 208 patients judged to have suffered from their first attack of myocardial infarction. The immediate mortality (i.e., within one month of onset) was 33 per cent. Still lower mortality figures have been recorded, as those of Smith, et al. (Smith, C., Sauls, H. C., and Ballew, J.: Coronary Occlusion: A Clinical Study of 100 Patients, *Ann. Int. Med.* 17:681 [Oct.] 1942) who in 100 private patients had an immediate mortality (i.e., within twenty-one days) of 12 per cent, and a total mortality of 34 per cent. The majority of these cases died in subsequent attacks of "coronary occlusion."

A careful study of clinical course in relation to prognosis was made by Rosenbaum and Levine, but no infallible prognostic signs were found. Their

studies indicate, as have others, that severe shock, extreme drop in blood pressure, or disturbance of heart function (arrhythmias, congestive heart failure) are bad prognostic signs. High and persistent fever or tachycardia are also bad signs. The patient's age and previous heart condition have a bearing upon the prognosis. The site of the infarct is much less important than previously suggested. The mortality in patients with anterior infarction was practically the same (30 per cent) as in those with posterior infarction (36 per cent).

The follow-up studies of cases of myocardial infarction made by the same authors (Rosenbaum, F. F., and Levine, S. A.: Prognostic Value of Various Clinical and Electrocardiographic Features of Acute Myocardial Infarction: Ultimate Prognosis, *Arch. Int. Med.* 68:1215 [Dec.] 1941) indicate that patients may return to a reasonably normal way of life for some years. The average survival period for 101 cases known to have died was forty-one months. One-fourth of these succumbed within one year, one-half within two years and three-fourths within five years. The remainder died after intervals ranging from five to twelve years. One living patient was still carrying on twenty-five years after the initial attack.

Recovery of activity was favorable in the group analyzed by these authors. These were records for 354 patients. Of these 30 per cent were able to return to full activity, 45 per cent to partial activity and 22 per cent to moderately restricted activity. Only 3 per cent were completely incapacitated.

Sixty-three per cent of all patients manifested angina pectoris some time after the initial attack of myocardial infarction, but only 28 per cent had subsequent congestive heart failure.

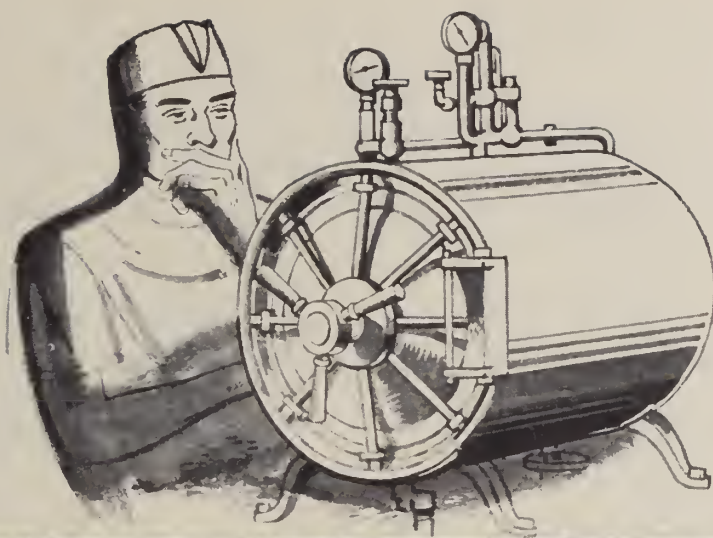
Summary of Practical Points

Beware of angina pectoris which occurs with increasing frequency and with less effort.

Increasing duration of anginal pain or change in its character usually means definite myocardial damage.

If permanent electrocardiographic changes are present a diagnosis of either coronary insufficiency or myocardial infarction should be made.

Prompt institution of rest to decrease circulatory demands will frequently prevent further myocardial damage.



"If I could only operate in an autoclave!"

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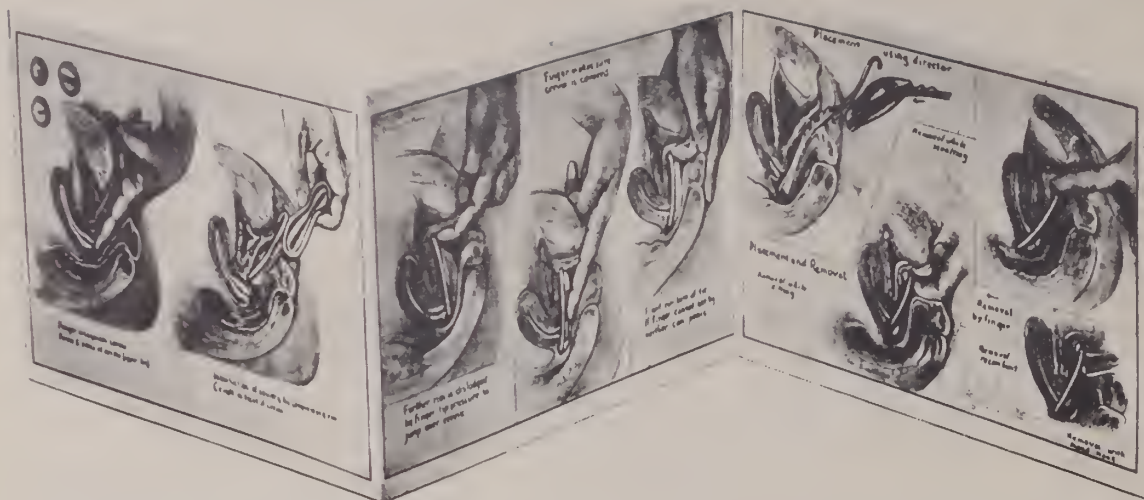
*Meyer, E., and Arnold, L. (1938), *Amer. J. Digest Dis.*, 5:418

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tion of milk sugar and potassium chloride; altogether forming an antirachitic food. When diluted according to directions, it is essentially similar to human milk in percentages of protein, fat, carbohydrate and ash, in chemical constants of the fat and physical properties.

RECENT ADVANCES IN SURGERY

SIMPLIFIED TREATMENT OF FRACTURES OF THE HUMERUS

The treatment of fractures of the humerus, and of the shaft in particular, has been in the past a difficult problem. They were often followed by unfavorable sequelae, such as non-union or permanent disability from joint stiffness as a result of prolonged immobilization in casts, splints or traction apparatus. No one method of treatment was much superior to another and all were more or less unsatisfactory.

In 1933 Dr. J. A. Caldwell¹ first advocated the use of the hanging plaster cast in the treatment of certain types of fractures of the humerus. Since that time the method has been enthusiastically adopted by an increasing number of surgeons. Results have been no less than startling. It seems to have brought the treatment of fractures of the humerus to an extremely simple and fool-proof stage.

The method is simplicity itself; it is merely the application of a loose fitting circular cast composed of three to four rolls of 4 inch plaster reaching from the wrist to a comfortable height in the axilla. The cast functions by gravity traction, being suspended near the wrist by a sling around the neck. A piece of felt is embodied in the cast and placed over the ulnar styloid. The elbow is bent at a right angle and the forearm placed in mid pronation. A pad in the axilla or near the elbow, shortening or lengthening the sling, will easily correct any undue angulation of the fragments. The patient is instructed as to the *modus operandi* of the treatment and warned to keep the cast dependent at all times and not allow it to rest on the arm of a chair or other convenient ledges. Manipulation is occasionally necessary before the cast is applied, but in most cases satisfactory reduction will automatically take place. The method is applicable to nearly all fractures of the humerus except those involving the supracondylar area.

First impressions of the method are invariably the same—it is thought that immobilization is not attained. This is undoubtedly true, but the excellent reports of substantial series in the literature and the results in a small number of personal cases, two of them compound, have been highly satisfactory to say the least. Not only are the results as far as

rapid union and alignment good, but the patient is made comfortable and ambulatory far more rapidly than with any other method. Stiffness of shoulder and other joints are minimal since active motion is permitted and possible almost at once. Complicated and expensive casts and splints are eliminated. In these days of crowded hospitals, and in the event of another blitz, these are no small factors.

In short, it is a simple, effective method of treatment that requires a fraction of the special knowledge and time formerly allotted to the problem of a fractured humerus.

C. M. BURGESS, M.D.

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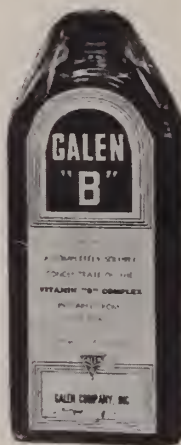




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CLINICO-PATHOLOGIC COMMENT

REVERIES OF A SENESCENT PATHOLOGIST

Bacteriology versus Histopathology

Bacteriology is the step-child of the average clinico-pathological laboratory; histo-pathology is the pampered, spoiled darling. All this is true for quite a number of reasons but primarily for two. First, the director of the laboratory is usually not well qualified in bacteriology, for he took his inadequate course in that subject too early in his academic career to have the proper perspective of its clinical importance, and because that course probably was taught by a Ph.D., on the fringe of medicine, interested only in some abstruse problem of his own, unrelated to clinical medicine. During his internship and residency in pathology, bacteriology was in the hands of some overworked technologist, so busy making culture media that she had no time to teach him the modern refinements. Secondly, the instruction he got as resident in pathology from the exalted professors was almost exclusively gross and microscopic pathology (most of it autopsy instruction from these professional, lineal descendants of Rokitsansky and Virchow, who remain forever faithful unto Death). Further, histopathology is usually about the only thing the director of the laboratory can do better than any of his employed technologists. Histo-pathology is about the only branch of laboratory medicine that is immune from the encroachment of the technologist or the Ph.D. on the fringe of medicine, for it takes, and always will take, not only a degree of M.D. and training in clinical medicine, but an advanced training in pathology to differentiate between a neoplastic cell and an exudative one, or between a histiocyte and a fibroblast.

So usually, in the average laboratory—private, clinic, or hospital—histo-pathology gets the cream and the poor step-child, bacteriology, gets the skimmed milk.

Other factors also have helped bring this to pass. Long ago the municipal, state and federal public health authorities, who were not interested in neoplastic disease except from a statistical point of view, were quite properly very interested in the infectious diseases that might assume epidemic proportions, as well as in their etiologic factors—bacteria

and the viruses. They established often quite competent laboratories which were available to the practitioners without fee or charge (taxes paid for all this) for the diagnosis of the enteric diseases, diphtheria, meningitis, tuberculosis, plague, typhus, pneumonia, tetanus, tularemia, actinomycosis, and now, more latterly, syphilis and, with vim, vigor and cultures, gonorrhea. The private practitioner of laboratory medicine ("laboratory medicine" really is as specialized a branch of the practice of medicine as is otolaryngology or surgery) who had to work for a fee to pay his technologists and feed his family could not compete with the free public health laboratory, so demands for bacteriologic examinations became more rare and he lost interest in the subject.

Besides, he had to keep on hand at all times a large variety of culture media, expensive, tedious to prepare, and prone to dry out, which became useless before a demand for it appeared.

Above and beyond all that, even more deficient in the science of bacteriology than the director of the laboratory was the clinician who patronized him. (The word "patronized" is used deliberately, with my tongue in my cheek.) The material which the average clinician brought to the laboratory for bacteriologic investigation would have made Pasteur or Koch tear each hair that remained to them.

These and other factors combined their malevolent influences to the end that now bacteriology is the step-child of the average clinico-pathological laboratory.

Parasitology

Parasitology, too, is on the wane; but who cares? It was usually a nasty, unsatisfactory, stinking job. With more soap and water, a higher standard of living, more efficient food inspection, screened houses, and highly efficient anti-rat campaigns such as we have had here in Hawaii, the importance of parasitology dwindles. Who cares whether 15 or 20 per cent of the citizens have a few encysted trichinae larvae in their bodies? Each also has a few warts, some nevi, and a few telangiectases equally harmful. But when the boys come home from Australia, New Zealand, Guadalcanal, Samoa, Cape Horn and Cape Hope, and way points, we may take a renewed in-

terest in this neglected subject. Hawaii sits tremblingly, watching the yellow fever virus and the vector of malaria.

Hematology

Hematology has been on the up and up. There are 57 varieties of methods for determining hemoglobin and of estimating normal percentages. And where there is argument, there is interest. When it was found that the liver that we used to feed to the cat would cure—or relieve—pernicious anemia, the clinician perked up his ears. And besides, a blood count was something ordered with ease, which gave the patient, by virtue of the prick that let the blood flow, assurance that something personal was being done for—or at least about—him, and gave the clinician time to digest the facts he had gathered. So today the "complete blood count" has become the mainstay of the laboratory—its very bread and butter, its pay roll, salary, unemployment tax, victory bond, war bond, income tax, personal property tax, real estate tax, narcotic tax, dividend tax, cigarette and liquor tax, war tax on club dues, social security, old age retirement—everything but labor union dues—and who knows, how long—how long? (Why can't we use the war as an excellent excuse for getting one tax and one tax only, predicated wholly on the ability of the individual to earn and pay it?)

Serology

Serology has been through quite a metamorphosis in the past fifteen years. "Serology" by common consent has come to mean the serologic diagnosis of syphilis*, and other important subdivisions have been almost forgotten; the Widal, Weil-Felix, Huddleson and blood grouping should properly be included in the term "serology." (Since the Seventh of December there has been quite a boom in blood grouping which followed the publicity of the Blood and Plasma Bank; most intelligent families in Hawaii are blood grouped down to the youngest member; it is fortunate that some are not so intelligent as to understand the Mendelian law of dominants and recessives.)

The day of the ten dollar Wassermann is as dead as Papa Wassermann himself. Along came Messrs. Michaelis, Sachs, Georgi, Meinecke, Kolmer, Eagle, Kline, Kahn, Hinton, Laughlen, Ide, and others too numerous to mention, who increased the specificity and sensitivity of the test, and decreased the technical difficulties until almost any office nurse was tempted to try her hand at the serologic diagnosis of syphilis.

***STS," serologic test for syphilis (Joseph Earl Moore).—Ed.

Today sera for the diagnosis or exclusion of syphilis that reach the average private laboratory are derived from that laboratory's usual patrons, or from patients who have had positive or controversial reactions at the plasma bank, the board of health, the industrial or insurance group,—and they are submitted for personalized investigation and a sort of supreme court decision. Serologic technique has become so refined and so accurate that syphilis is again in danger of becoming a serologic reaction rather than a disease. It is a wise—or fortunate—serologic laboratory that makes its reports only to a trained syphilologist, and not to the patient or to a general practitioner.

Along with the simplified technique, and working toward the same end as concerns the private laboratory, came the establishment of serologic service by the public health laboratories—without charge—for now the powers that be, in Washington, had decreed that syphilis was a national menace. There are, however, today still many people who shy away from the free serology where the records might inadvertently be open to unauthorized eyes. (I am reminded of the public health records seen by a friend of mine in the city of Rome, Italy, quite some years ago, on which were inscribed the positive serologic reactions of and the treatment received by an at that time inconspicuous, underpaid newspaper reporter by the name of Benito Mussolini. Possibly his gastric carcinoma of more than four recent years' standing is in reality nothing but the gastric crises of tabes).

So today the serologic diagnosis of syphilis, by both complement fixation and precipitation methods, is in every laboratory a very live subject, moderately remunerative, and therefore an average, well behaved normal child—not the step-child, and not the pampered darling.

Chemistry, Photometric

Clinical chemistry! What a bore, what a threat, blood chemistry used to be, and now—what a pleasure.

In the days when Dr. Archie Sinclair* and I were vying with each other to see who could practice the most accurate and progressive laboratory medicine here in Hawaii nei, blood chemistry came over the Hawaiian horizon like a three-masted schooner, slow but sure. Technical difficulties were many. Pure reagents were difficult to secure. Cork stoppers permitted evaporation. When one substance was to be investigated—for example, non-protein nitrogen—all steps had to be taken in para-

*Deceased.—Ed.



GIARDIASIS

Although evidence for the pathogenic nature of *Giardia lamblia* is not conclusive, this microorganism may possibly be the cause of diarrhea, abdominal pain and other symptoms of the clinical picture commonly referred to as giardiasis.

It has recently been demonstrated that *Giardia lamblia* can be eradicated from the intestinal tract with remarkable promptness by the administration of Atabrine Dihydrochloride.

The usual dose of Atabrine Dihydrochloride is 0.1 Gm. three times daily for five days.



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llet with a standard of known nitrogen content. And when the reactions were complete and color developed, the colors of the unknown and the standard had to be compared visually in a comparative colorimeter. There were so many sources of inaccuracy that the laboratory quailed every time it got a request for a blood chemistry. And when the reaction was based, not on comparative colorimetry, but on titration with an indicator, the elusive end point gave the laboratory personnel something to worry about during white nights.

All of that has been changed by the electric photocolormeter. This machine, with any constant colored solution, always gives the same reading on the millimeter. Known standards of vary strengths are put through the appropriate technique once, and the readings recorded. Thereafter only the unknown need be treated, read in the machine, and its concentration calculated from the previous calibration.

This has permitted a greater volume of work with increased accuracy and less cost, and has given rise to many new technical procedures. So many blood chemical analyses are now available that the clinician is hard put to keep up with them and acquire dexterity in the interpretation of the results. The really honest clinician does not pretend to remember these normal values and the range of pathological deviations; he keeps a list of them under his desk blotter and in his favorite nook in the hospital. The scope of this work may be realized when one surveys a list of practical quantitative procedures available, which includes N.P.N., creatinine, urea, uric acid, blood sugar, serum proteins (including partition into albumin and globulins), serum and urine calcium, blood, urine and spinal fluid concentration of all the sulfa compounds, spinal fluid pro-

teins, bilirubin (with accurate quantitative partition of direct from indirect), urobilinogen, chlorides, serum phosphorus, serum phosphatase, P. S. P. excretion, hemoglobin, and red cell fragility—quite an imposing list!

William S. Hoffman in the September 1942 issue of the American Journal of Clinical Pathology gives a bibliographic list, in his discussion of recent advances in photelometric clinical chemistry, of 149 such methods which are accepted or under study. It is a most valuable index for any one interested in clinical chemistry.

It is, then, obvious that clinical chemistry is in its heyday and not at all a neglected child of the laboratory. If I had a child in this day and age (God forbid!) I would dedicate it to clinical chemistry as the most hopeful field of medical usefulness.

E. A. FENNEL, M.D.

HAWAII SOCIETY OF CLINICAL PATHOLOGISTS

The Hawaii Society of Clinical Pathologists held its second tumor seminar on the evening of Feb. 20, 1943, at Tripler General Hospital. Sections from 10 cases, previously mailed to the men attending, were projected upon a screen and the cases discussed. Following the meeting refreshments, in the form of beer and sandwiches, were provided by the Army. The following doctors were present: A. Majoska, Louis Hirsch, E. A. Fennel, Harry Arnold, Jr., H. M. Johnson, I. L. Tilden, Major R. C. Wadsworth, Lt. Col. C. S. Moran, Lt. H. S. Bernet, Capt. O. Carp, Capt. De Oreo, Capt. D. Adler, Lt. Cmdr. L. E. Rector, Lt. Cmdr. C. R. Jensen, Lt. Cmdr. E. M. Butt and Major Carl F. Tessmer.

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PROGRESS REPORT

Dr. Baehr's Visit

The outstanding event since the last report was the visit of Dr. George Baehr, Chief Medical Officer of the National Office of Civilian Defense. He visited the Territory for two weeks, arriving here March 10, and made an inspection of the major medical installations on Oahu and the outside islands and held many conferences with department heads in the non-medical services of the O.C.D. with a view to improving and coordinating their control. His report has not yet been published, but he publicly expressed his approval of the general medical set-up and felt that it should continue along the same lines with minor changes in control and organization only. He particularly emphasized the fact that in England where greater experience has been had than in any other place, they have found it eminently desirable to have medical personnel and equipment at their posts of duty and not outdoors during air raids, until an incident has been reported to the control center which necessitates the dispatching of a specific unit to care for casualties. The streets of London are deserted during air raids except for wardens and fire workers and for ambulances or other vehicles traveling on specific duties. His remarks will undoubtedly be reported more extensively elsewhere. His visit was of inestimable value to the medical section of the O.C.D.

Additional Hospital Projects

Dr. Baehr also made a thorough inspection of various hospitals which have been awarded grants under the Lanham Act for addition of facilities with a view to endeavoring to expedite their construction. He also surveyed the need for classroom facilities for Queen's Hospital Training School for Nurses, an emergency ward for the evacuation of patients from Liho I necessitated by the movement of surgery to the ground floor, and the need for a small isolation unit at Queen's to permit the use of the present contagious-disease ward for kitchen purposes. He expressed himself as being of the opinion that these three projects were highly necessary and proper, and he will endeavor to obtain authority from the Interior Department for their construction when he returns to Washington. He also studied carefully the increasing deficit in available obstetrical hospital beds in the city and the project for remedying this situation by the construction of a 30 bed obstetrical

unit adjacent to St. Francis Hospital. This project has been disapproved by the Interior Department, but Dr. Baehr expressed himself as convinced of its urgent necessity and stated that he would endeavor to persuade the authorities of the Interior Department that it should be done at once.

Additional Contagious Hospital Beds

Since the last report, two 25 bed contagious wards have been built makai of the Kuakini Hospital to be held in reserve for the care of contagious diseases in the event of a sudden outbreak of an epidemic. Additional facilities have been arranged which would enable this unit to double its size in 24 hours if the need arises. One hundred hospital beds have also been constructed as an annex to the Wahiawa O.C.D. Hospital for the care of ambulant tuberculosis cases, 112 of which are now hospitalized at old Tripler. This hospital will begin to function as soon as a few items of essential equipment have been obtained.

Women's Ambulance Service Patrol (WASPS)

A group of sixty business women in Honolulu have been trained by the Provisional Ambulance Battalion of the Army for the driving of ambulances and the care and loading of casualties. The Honolulu Police Department and the Automotive Service Company assisted in the technical training of these women and the doctors of the Emergency Medical and Ambulance Service gave them their course in casualty care. They are attached for administration to the Medical Department of the Army and available to military or civilian communities as the need may arise.

High School Victory Corps

A group of high school boys have been recruited by the Department of Public Instruction under the direction of Mr. Thomas B. Vance and are staffing the Aid Stations at night and also serving as standby manpower for them in the day time. This is a part of the National High School Victory Corps program which it seems will probably be expanded into many fields of assistance to the war effort.

Evacuation Plans

A meeting of doctors, nurses and others interested in the plans for medical care of evacuees from the coastal plains of the North Sector of Oahu was held at the Wahiawa Hospital, October 11, 1942. At this meeting there was discussion of the general



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1. Shop early in the week and plan purchases as much as possible for the whole week, avoiding rush and "peak" hours in your grocery.
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3. Shop early in the day, not at closing time. Your grocer has lots of bookkeeping and cleaning to do in a hurry before blackout.

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plan and of the details for the operation of the Emergency Medical Service in the event that these areas have to be evacuated to the plateau. Necessary facilities have been provided at Wahiawa for the expansion of this hospital to a 500 bed institution and additional essential hospital facilities are provided and stored at Kunia School, Kipapa School, Waipio Camp, and Waimano Home; all of these being major evacuation centers.

Civilian Control

The return of many civil functions to the civil government has resulted in a large increase in the duties and responsibilities of the O.C.D., since several of these functions of government have been turned over to them. So far the medical department has been charged with the administration of control of medical supplies and poisons and of laboratories. There has been virtually no change in the systems of either of these administrations which will carry on under civil management instead of military as formerly. Changes in personnel, location and function of laboratories are required to be registered with the Territorial Medical Director, but information already on file is not required to be repeated.

"Unfreezing"

The release of the control of hospital employees, permitting nurses and non-professional hospital employees to discontinue work altogether or to seek work in other hospitals has not yet resulted in any large loss of hospital personnel. Hospital heads, however, generally feel that it is likely to do so. There has been considerable apprehension among those responsible for the administration of hospitals as to what will ultimately happen in this regard.

Military Personnel in Civilian Hospitals

Almost from the beginning of the war it has from time to time been necessary for the Medical Department of the Army to supply medical officers, nurses and enlisted men to complement the staffs of civilian hospitals and to assist the Board of Health in the carrying out of their functions. With the return of government to civil control, some of this personnel will probably be withdrawn from their civilian duties. The shortage of physicians willing and able to perform these duties makes the replacement of Medical Officers from civilian sources almost impossible and the inability of the nurses' recruitment organization to obtain faster transportation for nurses from the mainland makes the shortage of nurses worse than it has ever been. Several hospitals in the Territory would have to entirely or partially close their doors if these army nurses are withdrawn unless nurses in civilian life who are now unemployed or working at other jobs take their

places. Large numbers of registered nurses are working at occupations not connected with their profession because they are earning considerably larger pay and have much easier work. Many of these women have agreed to report to hospitals in the event of enemy action, but for full time operation they are of course of no assistance to the hospitals. Almost all of the hospitals in the Territory are conducting courses for nurses' aides and endeavoring in every way to decrease the load upon the nursing staff, but the problem remains a serious and acute one. As has been repeatedly pointed out the medical profession can be of tremendous assistance in this acute situation by avoiding the use of special nurses, except when they are actually necessary for the patient's welfare and by sparing the staff nurses from non-essential duties in the care of patients. It is highly probable that the nursing shortage will continue for the duration and may become much more serious than it is now.

On February 16th, Miss Margery J. MacLachlan, from Decatur, Illinois, was employed by the O.C.D. as Hospital Consultant and Supervisor. Her services are available to any hospital in the Territory upon request to assist in utilizing their nursing staff to the best possible advantage. She is in the office of Mrs. Thelma Akana, Territorial Supervisor of Nursing Activities for the O.C.D.

Outside Islands

The O.C.D. Emergency Hospital at Huleia on Kauai has been completed, equipped and staffed. The nursing staff of the hospital, pending the arrival of patients, is being utilized as a pool of nurses which may fill emergency needs in the community with certain restrictions. The primary function of this group of nurses is to staff the hospital for the care of civilian casualties and secondarily to assist in meeting nursing emergencies and to carry out educational programs, etc.

The hospital at Waimea, Kauai, is complete and will be occupied within a week or so. It is built up the canyon at a distance above the confluence of Waimea and Makaweli rivers and thus rendered safe from attack from the sea. It will be operated by the doctor and staff of the Waimea Hospital.

The O.C.D. Emergency Hospital at Olaa on Hawaii has been completed and is occupied. It is being operated by the Olaa Plantation physician and at present is staffed entirely with Army nurses from the U.S. Army Hospital at Mountain View.

The new wing of the Hilo Memorial Hospital has been equipped so that it has a potential capacity of 100 casualties.

H. L. ARNOLD, M.D.
Territorial Medical Director

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COUNTY SOCIETY REPORTS

HAWAII COUNTY MEDICAL SOCIETY

The 211th meeting of the Hawaii County Medical Society was called to order on January 19, 1943, at the Hilo Memorial Hospital by President Patterson. Sixteen members and eight guests were present.

Dr. A. Orenstein, director of the Emergency Medical Division of the O.C.D., reported on the past activities and present status of the program. He reviewed the set-up of the casualty stations which had its inception with the local medical society and traced its growth to the present scheme of operation under the O.C.D. He stated that these stations have been, and are still, manned entirely by volunteers, that the general plan had been to decentralize these stations, and that the peak of interest was reached some 4-5 months ago since which time there has been some reduction in attendance of the staff. He stressed that the difficulties encountered were chiefly due to inadequate equipment and supplies, especially in regard to auxiliary light plants, but that this problem has been solved in the last 5-6 months; he also pointed to the fact that these supplies have been, and will continue to be, distributed equitably, the determining factors being distribution of population and the index of possibility of attack. He posed a problem in connection with the plan of operation of these stations, which had been brought to his attention by a circular letter from O.C.D. headquarters in Washington; namely, should these stations be abolished and be replaced by a central unit manned by professional units and rescue squads whose training would be devoted chiefly to immediate first aid and shock treatment? He believed that the present set-up was the preferable arrangement.

Dr. C. Bruce Brown, director of the Blood-Plasma Bank for this island, gave a statistical report of the activities of the bank ending December 31, 1942. He stated that Dr. Pinkerton, director of the Territorial Bank, recently visited the island and suggested (1) that all liquid plasma over one year old be discarded, (2) that all plasma processed in the future be stored in the frozen state, and (3) that a full-time person be employed by the local bank to recruit donors. Dr. Brown reported that there had been a waning in the response of donors. He be-

lieved that an adequate supply of blood and plasma could be obtained by the use of a mobile unit and stated that plans were now in effect to obtain such a unit.

Dr. Patterson reported on the progress of the O.C.D. Hospital at Olaa. He stated that the hospital would be occupied by February 1, that its capacity was 103 beds, and that the present plan called for the operation of the hospital by the Olaa Sugar Company. He further stated that in his plans for evacuation in the event of attack, only 7-8 patients were of the "obligatory-hospitalization" group, that this would leave 154 adult beds and 11 bassinets available for casualties in the old and new plants. He stated that 3 surgeries and an obstetric wing of 18 beds were available in the new unit, that the water supply was sufficient and auxiliary sources of electrical power had been furnished. The present plans, he concluded, included the formation of a pool of 8 nurses who would serve as a unit from which hospitals on the island could draw.

Dr. L. L. Sexton reported on the preparedness of the Hilo Memorial Hospital to care for casualties. His plans included: (1) evacuation of mobile cases by the installation of ramps and of immobile cases into the basement, (2) splinter-proofing and ventilation which have been completed, (3) erection of an auxiliary surgery and sterilization facilities in the basement, and (4) the division of professional and non-professional staff into teams composing the following: (a) triage, (b) shock, (c) major surgery, (d) minor surgery. He stated that the problem of transportation teams as evidenced in the last trial run in July, 1942 was nearing solution. He reiterated that the chief problem concerning the care of casualties was the insufficiency of professional personnel including doctors, nurses, anesthetists and laboratory technicians.

An open discussion of the various functions and activities of the emergency medical division followed. Col. Wollgar, Acting District Surgeon and Surgeon of the Hawaii Service Command, was of the opinion that the entire program was functioning satisfactorily, that in the event of attack, there would be collaboration between the military and civilian medical organizations.

No discussion took place regarding the advisability of centralizing aid stations in conformance with the circular letter mentioned by Dr. Orenstein. It was the consensus that another trial run was indicated in the near future to determine the efficiency of the aid stations and the hospital units.

Regarding the blood-plasma bank, several lines of discussion concerning the insurance of better donor response occurred: (1) it was suggested by Dr. S. R. Brown that a stimulus of the general public would be provided by shipping to combat zones a specified amount of plasma at periodic intervals; (2) it was suggested by Dr. Leslie that the suggestion proffered by Dr. Pinkerton that a full-time recruiting person be employed by the local bank be followed; (3) it was generally agreed that a mobile unit would enlarge the supply of plasma.

The transfers of Drs. W. F. Leslie of Puumale Home and R. P. Wippermann of Naalehu, both from the Honolulu County Medical Society, having passed the Board of Censors, were unanimously passed.

The 212th regular meeting of the Hawaii County Medical Society was called to order on February 16th, 1943, at the Hilo Memorial Hospital by President Patterson. Twenty members and nine guests were present.

Major Waldemar Sternberg, Chief of the X-Ray Department of the Mountain View Hospital, led the discussion. Members of the Society presented brief summaries of cases and exhibited x-rays. Major Sternberg discussed the differential diagnosis, from the roentgenographic viewpoint, of each case. Major Sternberg then exhibited a few x-rays of duodenal ulcer and bony structural anomalies.

Dr. Orenstein moved that the Secretary's report as mailed out to each member be approved without reading. Seconded by Dr. Phillips. Passed.

Captain Marcus Flinter of the local Board of Health discussed the epidemic of pertussis now on the island. He stated that vaccination was efficacious in the prevention of, and in the amelioration of symptoms of, pertussis. He requested that the Society request the Territorial Board of Health to provide pertussis vaccines for indigent cases. After considerable discussion, it was moved by Dr. S. R. Brown, seconded by Dr. Arimizu, that the Society request the Territorial Board of Health, through Captain Flinter, to furnish prophylactic vaccine against pertussis. Carried.

A letter from Dr. Richard K. C. Lee, Acting Territorial Commissioner of Public Health, regarding the resolution, adopted by the House of Delegates of the American Medical Association, stating that commercialized prostitution be eliminated, that medical inspection of prostitutes was untrustworthy, inefficient and unlawful, was read. Dr. Lee stated that several local medical societies have passed similar resolutions and recommended the adoption of such a resolution by the Society. Considerable discussion followed. The Venereal Disease Committee reported that the present scheme of rigid control and close medical supervision of prostitutes was effective in the control of venereal disease at present, that further scientific study should be made on the present mode of control, that the question should be given mature consideration and considerable open discussion before such a resolution should be adopted by the Society. Captain Flinter corroborated these statements and believed that, in view of the facts that there existed no carriers or transient prostitutes on this island, such a resolution would be out of order at the present time. Dr. Carter moved, seconded by Dr. Phillips, that the discussion of this problem be postponed.

M. LEONG CHANG, M.D., reporting.

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ACID-FAST BACILLI IN THE SPUTUM

D. R. CHISHOLM, M. D.

BACILLUS TUBERCULOSIS VIEWS REGARDING THE DIAGNOSTIC AND PROGNOSTIC IMPORTANCE OF ITS PRESENCE IN THE SPUTUM

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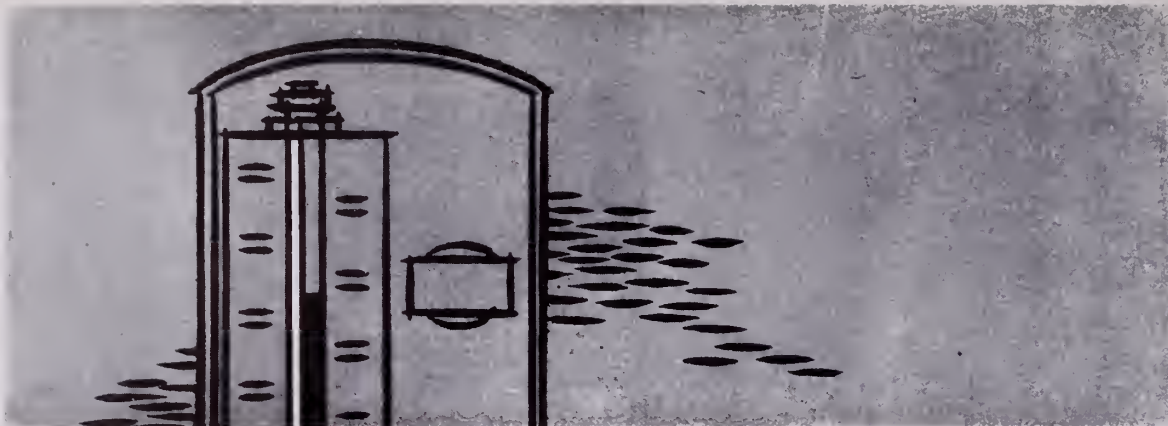
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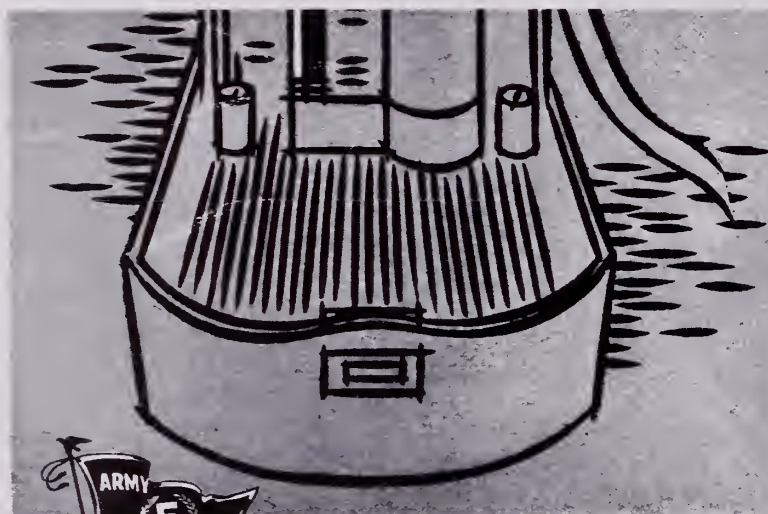
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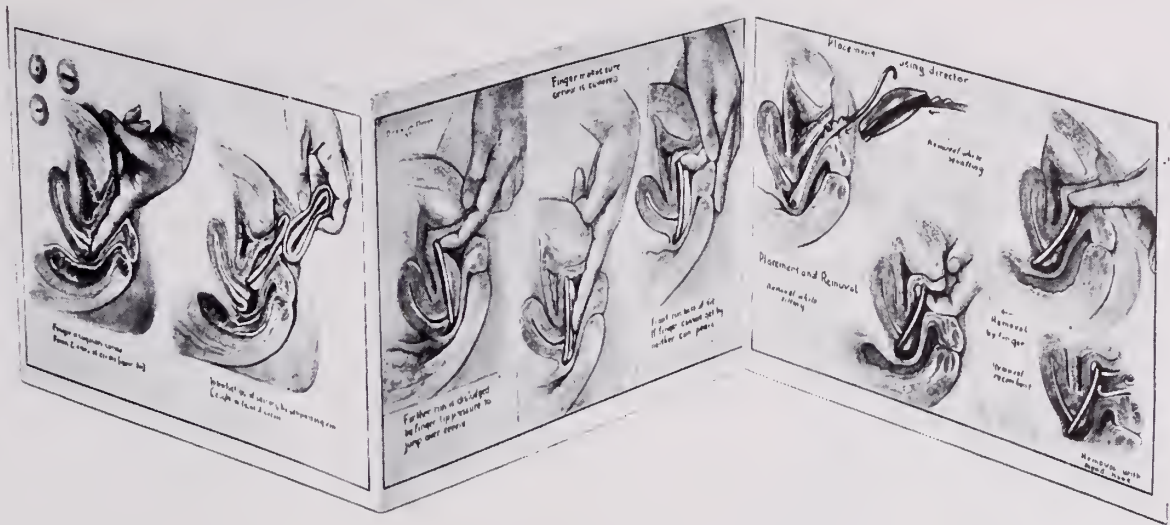


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Acid-Fast Bacilli in the Sputum

D. R. CHISHOLM, M.D.

Kealia, Kauai

This paper has been written with the idea of offering to the interested private physician an opportunity to review the significance of the presence of acid-fast organisms in the sputum. The subjects considered include the clinical value of positive sputum, contamination with acid-fast organisms, the value of the various methods of demonstrating the tubercle bacillus, opportunities for error in the bacteriological diagnosis of tuberculosis, and clinical notes on the associations of acid-fast organisms with positive and negative roentgenograms of the chest.

THE CLINICAL VALUE OF POSITIVE SPUTUM

The discovery of tubercle bacilli in the sputum is of value for the following reasons: (a) It proves tuberculosis is present. (b) It proves that the disease is active. Although one can often state that the disease is active by the roentgenologic appearance of the lungs, the reverse is not true. There are no criteria by which one can diagnose inactivity from a single film, or, in some forms of the disease, from a series of films. Sputum studies will often reveal that a lesion, indiscreetly labelled inactive by the reader of the film, is a plentiful source of tubercle bacilli. (c) It proves that the patient is infectious, and suggests that already he may have infected some of his contacts. (d) The numerical trend of the sputum studies toward positive or negative findings is one of the best guides to the course of the disease and to the treatment indicated.

Appreciation of the significance of the above factors explains why the sanatorium physician is willing to go to any length to prove or disprove the presence of tubercle bacilli in a patient's sputum.

Negative sputum, even persistently negative sputum, does not exclude tuberculosis from the differential diagnosis. The most careful technician may fail to demonstrate bacilli in the late stages of acute exudative tuberculosis even when the roentgenologic appearance of the lesion suggests caseopneumonic disease, or in extensive acinous-productive involvement when two-thirds of the entire pulmonary area may appear to be involved. In such cases, bacilli are probably always present, at least intermittently, even though direct sputum cultures or animal inoculations are negative. This is demonstrated by the frequency with which gastric concentrates will reveal bacilli following animal inoculation.

When bacilli are present in the sputum, failure to find them by routine tests is usually dependent on

one or more of four factors, namely, paucity in number, intermittent presence, unsatisfactory sputum specimens, and the personal equation of the technician. A common source of confusion arises when a careless laboratory technician reports an obviously unsatisfactory specimen (saliva) simply as 'negative,' when it should be reported as 'negative—unsatisfactory specimen.' A satisfactory specimen of true sputum from the same patient might be teeming with tubercle bacilli.

A GENERAL NOTE ON CONTAMINATION BY ACID-FAST ORGANISMS

Many saprophytic, acid-fast bacilli are found in nature. The timothy or grass bacillus is the most common of these organisms. Baldwin, at Saranac Lake, has shown that nonpathogenic, acid-fast, soil bacilli may be obtained with ease from washings of fruits and vegetables.¹ As Baldwin suggests, the inference is obvious that such bacilli must frequently be present in saliva, sputum, and gastric washings. They must also be plentiful in dust. They must be, and indeed are, ubiquitous. It is so common to find acid-fast organisms in old distilled water that laboratory workers often refer to *the* distilled water bacillus. Tap-water often contains saprophytic acid-fasts, and such organisms may be obtained in scrapings from the inside of water-faucets.²

Mention is made of these saprophytic acid-fasts, and of their ubiquity, to emphasize the fact that the finding of one or two acid-fast bacilli in the sputum on a single occasion is not in itself conclusive evidence of tuberculosis. Nevertheless, and in spite of the abundant opportunity for contamination with nonpathogenic acid-fasts, it is a clinical fact that the presence of acid-fasts in the sputum is nearly always synonymous with the presence of tubercle bacilli in the sputum.

Considering the ubiquity of nonpathogenic acid-fasts, and the facility with which they may enter the respiratory tract via inspired air or ingested food, it becomes a matter of interest as to why they are found with such relative infrequency in the sputum. Baldwin states that nonpathogenic acid-fasts vary between phases of acid-fastness and non-acid-fastness, and suggests that one reason nonpathogenic acid-fasts are not more commonly identified in sputum is that they exist in a non-acid-fast stage in the human body.¹ Corper has shown that tubercle bacilli must be present in sputum to the extent of at

least 100,000 per cubic centimeter before there is even a fair chance of finding them by direct smear under the microscope.³ The same relative chances must hold for any other organism. It is very likely that saprophytic acid-fasts only rarely occur in sputum in anything like the numbers attained by the tubercle bacillus. In the majority of cases they are present as transients. Then, of course, saprophytes found in some smears may not have come from the sputum at all, merely representing sparse contamination from slides or reagents. All in all, the factor of numbers is probably most responsible for the rarity with which nonpathogenic acid-fasts are found in the sputum by direct smears, or even by concentrates. The fact that nonpathogenic acid-fasts occasionally are found persistently in the sputum does not invalidate the dictum that acid-fasts in the sputum are to be considered tubercle bacilli until proven otherwise.

It is to be noted that the tubercle bacillus itself may be a contaminant in the laboratory. Tubercle bacilli may be present on previously used slides, in centrifuge tubes used for sputum concentration, in common staining baths which are, but should not be, used for bacteriological work, and on oil immersion lenses and glass rods which are often allowed to come in contact with smears.

In laboratories doing sputum concentration work, every now and then a fifty cc. centrifuge tube breaks in the centrifuge. When this happens, and the tube container is not large enough to hold all the fluid, a fine spray of the sputum mixture spreads over the laboratory. If the method being used to liquefy the sputum does not kill the tubercle bacillus, that spray may be full of living organisms. No one who has ever seen this accident happen could have any doubt as to the opportunities for subsequent contamination of slides, glassware, reagents, and laboratory dust. Nor could one doubt the hazard to the laboratory workers under such circumstances. Another source of contamination is the sputtering from a loop being sterilized in a flame. When the sink is used for the disposal of urine, slide washings, centrifuge tube washings, etc., the spattering when the tap is turned on may result in laboratory contamination with dead or viable organisms. Because of the factor of chance, such contamination is largely of theoretical importance in direct smear work, but may be of considerable practical importance in concentration work. It should be of little significance in culture work if sterile technique is used throughout.

THE DIRECT SPUTUM SMEAR

Searching for a specific organism in sputum which contains fewer than 100,000 such organisms to the cubic centimeter is like looking for a needle in a haystack. Failure to find the needle does not

mean that it is not there. The significance of this fact is enormous. If a sputum contains, let it be supposed, only 75,000 bacilli per cubic centimeter, that sputum is obviously infectious, and yet it might be declared negative after many direct smear examinations had failed to demonstrate the bacilli.

There is another reason why the direct smear must be interpreted with some caution. When acid-fasts are found in the direct smear, their identification as tubercle bacilli can be made only on morphologic grounds. And there are no constant morphologic differences between the tubercle bacillus and many other acid-fasts.

The value of direct smear examinations varies with the type of sputum being examined, with the number of organisms the sputum contains, and with the experience, carefulness, and patience of the technician. Of the latter, little need be said. In a panel discussion by leading tuberculosis authorities before the Medical Section of the American Trudeau Society, the majority of the experts agreed that a smear should be examined for at least ten minutes before being judged negative.⁴ The Committee on Standard Laboratory Procedure of the American Trudeau Society recommends as a minimum standard that approximately five hundred microscopical fields should be examined before a slide may be called negative.⁵

When abundant purulent sputum results from tuberculosis, the tubercle bacillus usually can be found in that sputum with relative ease. It may be accepted as a fairly reliable clinical axiom that when three careful searches in purulent sputum fail to demonstrate the tubercle bacillus, it is unlikely that the sputum is associated with tuberculosis. Definite exceptions to this may be the either independent or consequential association of bronchiectasis with chronic fibrotic tuberculosis.

When sputum is scanty, as it often is, either because little is produced or because the patient swallows most of it, the careful selection of a small mucopurulent fleck from the sea of saliva, and its examination by direct smear, may produce immediate positive findings.

Pottenger has demonstrated the importance of making sure that smears are properly stained.⁶ Thus, he reports a gain of forty-six per cent in slides diagnosed as positive when the smears are deeply stained as compared with light staining. He also found picric acid to be a definitely superior counterstain in ability to reveal a maximum number of acid-fast organisms.

Weiss describes a new method of staining the tubercle bacillus which makes the organism much easier to demonstrate microscopically.⁷ A very intriguing method of demonstrating the tubercle bacillus is that of fluorescence microscopy.⁸ In this

procedure the bacilli are stained with a fluorescent dye, illuminated by an appropriate wave-length, and examined under the microscope.

If direct smear findings are open to the slightest question, the physician is charged with the responsibility of studying the sputum by culture or animal inoculation.

CONCENTRATION OF TUBERCLE BACILLI IN THE SPUTUM

Tubercle bacilli in the sputum are enveloped in masses of mucopurulent material which is not soluble in saliva or water. In order to increase or concentrate the number of bacilli per unit volume, they must first be freed from the trap of mucopurulent sputum. This is effected by digesting or dissolving the mucopurulent material in some chemical solution, of which one of the best is a four per cent solution of sodium hydroxide in commercial Clorox, the latter being essentially a five per cent solution of sodium hypochlorite. This mixture, which approximates fifty per cent antiformin, dissolves the mucopurulent material and non-acid-fast organisms within a minute or so. It does not, happily, dissolve the acid-fast tubercle bacillus.

Once freed from enveloping mucopus, the tubercle bacilli may be concentrated by centrifuging or by other physical methods, such as emulsifying the treated sputum with xylol and allowing the bacilli to collect in the xylol cream which rises to the surface. The sputum concentrate is stained by the usual acid-fast method and examined microscopically.

Sputum concentration magnifies all the opportunities which the direct smear possesses for turning out false-positive slides. The xylol flotation method is so sensitive that the technician must be careful not to obtain false-positives by showing up acid-fast organisms, dead or alive, pathogenic or nonpathogenic, which come from improperly cleaned laboratory glassware, especially from slides, centrifuge tubes, or emulsifying tubes that have been used for previous cases. Proper laboratory technique, however, will reduce the chances of obtaining false-positives to a clinically insignificant degree. Such technique presupposes that, before being used, all laboratory glassware is boiled for half an hour in a weak solution of lye and then allowed to soak in the well known bichromate and sulfuric acid cleaning fluid for twenty-four hours. This twenty-four hour soak in acid bichromate solution is a minimum requirement of the Committee on Standard Laboratory Procedure of the American Trudeau Society.⁵

Sputum concentration is a very satisfactory, practical method for revealing the tubercle bacillus and is now the standard, routine procedure in many sanatoria. The value of the concentration test as compared with the direct smear is, of course, ob-

vious. This value will vary with the number of bacilli present, with the degree of concentration attained, and, as in the case of the direct smear, with the technician's conception of proper staining methods and of how many microscope fields should be examined before calling a slide negative. It is impossible to overestimate the importance of this personal factor in the microscopic search for pathogenic organisms.

EXAMINATIONS OF THE FASTING GASTRIC CONTENTS

Many patients with roentgenologic and clinical evidence suggesting tuberculosis are not conscious of raising sputum and it is difficult to obtain satisfactory specimens from them for examination. Such patients are often continuously, although unconsciously, swallowing small amounts of sputum which become 'pooled' in the stomach. Concentration of the fasting gastric contents and subsequent examination by smear, culture, and animal inoculation is an excellent method for demonstrating the tubercle bacillus in a considerable percentage of these cases. Gastric lavage for tubercle bacilli is of particular value in children, who nearly always swallow their sputum.

The value of examining the fasting gastric contents for tubercle bacilli has been firmly established by much careful work, and the procedure is now a routine one in most sanatoria. In a series of one hundred and twenty-three newly admitted tuberculous patients, Roper and Ordway doubled their recovery of tubercle bacilli by adding concentration and animal inoculation of gastric contents to a parallel study by smear and animal inoculation of direct sputum.¹⁰ Other investigators have had even more spectacular results.¹¹ Through use of this method during the past decade or so, many experienced tuberculosis specialists have had to revise their conception of the relative stability or activity of 'healed' lesions. Negative gastric cultures or guinea pig inoculations offer a much better guarantee of true healing than similar negative examinations of the direct sputum.

Roper and Ordway emphasize the well-known fact that the number of tubercle bacilli in a particular patient's sputum may vary greatly from day to day, or in afternoon specimens as compared with morning specimens, this variability holding true both for direct sputum examinations and gastric washings. The conclusion, as in the case of direct smears, is that repeated gastric lavages should be carried out if the first is negative.

CULTURE OF THE TUBERCLE BACILLUS

Nationally known authorities have done much careful experimental work in order to determine the relative sensitiveness of concentration, culture, and

animal inoculation methods for demonstrating the tubercle bacillus¹². Results vary with the techniques used. In general it may be stated that the best cultural methods hold an unquestioned superiority over the best concentration methods and are only questionably inferior to animal inoculation. This does not provide an argument for dispensing with animal inoculation. Culture and animal inoculation complement each other in the elimination of inherent deficiencies in the separate methods.

Artificial culture offers an extremely sensitive means of detecting the tubercle bacillus in pathological material. This statement is subject to a condition, however. It holds true only if modern, technically perfect culture media are used, if meticulous care is taken to prevent contamination, and if care is taken in identifying the organism grown.

In recent years there have been great advances made in media for culturing the tubercle bacillus. The media recommended by the Committee on Standard Laboratory Procedure of the American Trudeau Society are Loewenstein's medium as modified by Jensen and Holmes, or as modified by Petrik, and Petragnani's medium as modified by Saenz⁵. Corper criticizes the employment of these complex media for diagnostic culture work, and shows that his simpler egg-yolk medium is equally efficient¹⁵. It cannot be too greatly emphasized that the success of the culture method will vary tremendously with the degree of adherence to technical details in preparing the media. Some of these details have been recently reviewed by Corper and Cohn¹⁵.

Falsely negative cultures may result from (a) the use of unsuitable culture media—important, (b) too thick a layer of inoculum on the medium, thereby excluding oxygen from the bacilli—important, (c) overtreating the specimen with chemicals used to destroy contaminating organisms, (d) failure to neutralize the material for inoculation following treatment for concentration or contamination, (e) failure to inoculate several tubes, (f) failure to incubate long enough, or (g) prolonged exposure of the material to light prior to attempts at culture.

Falsely positive cultures may be reported as the result of one of two errors, viz: (a) Contamination of the culture tube with tubercle bacilli from a source other than the specimen being examined. (b) Contamination of the culture tube with a non-pathogenic acid-fast which is mistaken for the tubercle bacillus. This group would also include cases of mistaken identity involving such organisms as the smegma bacillus and acid-fast diphtheroids actually present in the specimen being cultured.

In a laboratory where much examination of tuberculous sputum, urine, etc., is being done, occasionally contamination of cultures is inevitable unless certain precautions are taken. This is particularly so

when the sputum, urine, etc., to be cultured is first concentrated in unsterile glassware previously used for identical purposes. It should be remembered that the tubercle bacillus is difficult to kill by chemical means. Thus, ten to fifteen per cent sulfuric acid will not kill the tubercle bacillus or destroy its ability to grow in culture even after half an hour's contact in an emulsion with sputum.

In this connection it is only fair to state that false-positive contaminations with the tubercle bacillus are not necessarily the fault of the laboratory. The contamination may have come from an unsterilized sputum bottle, from an unsterilized urinal, or from the twenty-four hour specimen bottle in which the urine was collected. (For an excellent discussion of the survival and viability of the tubercle bacillus outside of the human body the reader is invited to study the article on the subject by C. Richard Smith.¹⁶). Likewise, the physician should not hastily condemn, because of a negative roentgenogram, the laboratory finding of a positive sputum culture. The laboratory findings may be accurate and correct, as will be seen presently when this matter is discussed more fully.

The sensitivity of the guinea pig inoculation test is often emphasized by the statement that only a very few bacilli (one or two, according to some authorities) are sufficient to cause tuberculous disease. It is equally true that a single viable bacillus is capable of developing into a gross culture, a fact which makes evident the significance of meticulously avoiding contamination in culture work.

The experienced and careful laboratory worker will seldom if ever mistake a saprophytic acid-fast culture for a culture of the tubercle bacillus. Rate of growth and cultural morphology are usually distinctive. Macroscopic growth appearing before twelve days should make the technician suspect that he is not dealing with the tubercle bacillus. Growth of the latter organism usually becomes apparent between the seventeenth and thirtieth days. All cultures should be examined microscopically for acid-fast bacilli. Macroscopic growths of tubercle bacilli are not easily emulsified, a property which helps to distinguish tubercle bacilli from other acid-fast. Growth of an acid-fast organism at room temperature serves to distinguish it as nonpathogenic.

Acid-fasts obtained from atypical macroscopic growths, and which are microscopically typical of tubercle bacilli, often are not tubercle bacilli¹⁷. They may be smegma bacilli, an organism which sometimes fairly closely resembles the tubercle bacillus both microscopically and in cultural characteristics¹⁸. Whenever there is the slightest suspicion as to the identity of an acid-fast organism obtained by culture, a guinea pig inoculation with the culture should be made. The laboratory worker who is not

critical of variations in the appearance of macroscopic growths, who interprets his cultures without microscopic confirmation, and whose suspicions are not easily aroused by atypical staining and morphology of acid-fast organisms, will inevitably make occasional false-positive diagnoses.

Pappenheim's stain is not entirely satisfactory as a means of differentiating between the smegma bacillus and the tubercle bacillus. Bent and West describe a method of differentiating between these two organisms by growing them on Petragnani's or Petroff's medium containing malachite green or some other triphenylmethane dye¹⁹. The smegma bacillus causes decolorization of the dye. The tubercle bacillus causes no decolorization.

The human, bovine, and avian types of the tubercle bacillus can be readily differentiated by cultural characteristics and reaction of animals to inoculation. Bovine bacilli will kill a rabbit in two to five weeks. Human bacilli produce a mild disease in the rabbit, death being delayed for six months or longer. Guinea pigs are very susceptible to the human and bovine bacilli, but very resistant to the avian bacillus.

ANIMAL INOCULATION

Guinea pig inoculation is probably the surest means of detecting or ruling out the presence of the tubercle bacillus in pathological materials. If bacilli are present, their detection is almost a certainty. Some culture enthusiasts, not without an abundance of supporting evidence, will deny this alleged superiority of animal inoculation.

The great advantage of the animal inoculation method is that it not only discovers bacilli when present but identifies them beyond question through the development of tuberculous disease. The two disadvantages of the animal inoculation method are the time required for tuberculosis to develop in the animal, and the cost.

Except when the guinea pig shows evidence of tuberculosis, the safest rule is to keep the animal for three months before killing and examining it. It is a common practice, however, to kill and autopsy the animal at six weeks. Caseous enlargement of the lymph glands draining the inoculation point in the groin is the usual evidence sought. If the pig is killed early, the glands may be enlarged but not caseous. The spleen or liver may show tubercles. Diagnosis should not be considered unequivocally positive until smears are made. When the guinea pig has been injected with an atypical culture, histologic sections may be advisable. False-negatives are possible if the animal is killed too soon, or if the bacilli were killed by overtreatment with the chemicals used to destroy contaminating organisms. False-

positives are possible from unsterile sputum bottles, unsterile centrifuge tubes, etc.

NEGATIVE CHEST X-RAY ASSOCIATED WITH NON-PATHOGENIC, ACID-FAST ORGANISMS IN THE SPUTUM

Occasionally the physician is confronted with the problem of a negative chest film but the presence of acid-fast organisms in the sputum. The question immediately arises as to whether these organisms are pathogenic or nonpathogenic.

The possibility of sputum being contaminated with acid-fasts from water, soil, and food has already been noted. At least two cases are reported in the literature in which nonpathogenic acid-fasts were repeatedly present in the sputum of patients who had cardiospasm and pulmonary induration, the latter resulting, presumably, from aspiration of food²⁰.

The smegma bacillus has been identified fairly frequently in the sputum of bronchiectasis. One can well imagine with what ease this bawdy organism might adjust its unrefined tastes to such an environment.

When leprosy bacilli are present in the nose, they may also be found in the sputum, especially if concentrates are done. In Hawaii this possibility must always be remembered.

The most common saprophytic organisms inhabiting the nose and nasopharynx are those constituting the group known as the diphtheroid bacilli. These diphtheroids may sometimes develop varying degrees of acid-fastness, and, as may be surmised from the following case reports, might be mistaken for tubercle bacilli.

CASE 1. R. K., No. 8829, a Hawaiian woman, aged 74, was admitted to the Leahi Hospital on Oct. 17, 1939, with a diagnosis of pulmonary tuberculosis based on chronic cough, questionable roentgenologic evidence, and the finding of acid-fast bacilli in the sputum by smear on several occasions. The patient was found to have arteriosclerosis, hypertensive cardiac enlargement, and positive Wassermann and Kahn reactions. Roentgenograms of the chest showed only slight accentuation of the perihilar markings, a change interpreted as probably of cardiac origin. Sputum examinations revealed a considerable number of acid-fast bacilli in almost every specimen. They closely resembled tubercle bacilli, but further studies by cultures (three) and guinea pig inoculation (one) were negative. Nasal scrapings revealed acid-fast organisms similar to those obtained in the sputum. Consultation with the medical staff of Kalihi Hospital failed to reveal clinical evidence of leprosy. The organism was studied extensively in the Leahi Hospital laboratory and in the Kalihi Hospital laboratory and was finally interpreted as being a weakly acid-fast diphtheroid. The patient was discharged as having no tuberculosis.

CASE 2. C. D. H., No. 7092, a Chinese man, aged 55, was admitted to the Leahi Hospital on May 9, 1934, on the basis of positive sputum. The chief

complaints were headache, weakness, foul breath, and excessive salivation. Roentgenograms of the lungs were essentially negative. Several direct sputum smears revealed acid-fast bacilli. Four cultures and one guinea pig inoculation failed to demonstrate the tubercle bacillus. Subsequently, nasal swab and throat swab smears were found to contain the same organism. The specific identity of the organism was not determined. As in the previous case, it was quite likely a diphtheroid. Skin snips and clinical examination for leprosy were negative.

It might be pointed out here that failure to secure a culture of an acid-fast organism which is known to be present in a specimen is in itself good evidence that the organism is not the tubercle bacillus. Saprophytic acid-fasts are more readily killed by the chemicals used to destroy contaminating organisms in the specimen before culture inoculation is made.

POSITIVE CHEST X-RAY ASSOCIATED WITH NON-PATHOGENIC, ACID-FAST ORGANISMS IN THE SPUTUM

CASE 3. A. K. H., No. 7673, a Hawaiian woman, aged 53, was admitted to the Leahi Hospital on Feb. 21, 1936. This patient was a contact to her daughter, who had far-advanced pulmonary tuberculosis. Her only complaint was of a productive cough. Physical findings consisted of low-grade fever, atrophic rhinitis, chronic suppurative sinus disease, and coarse bubbling rales over the lower two-thirds of both lungs. The chest film showed bilateral basal infiltrations suggesting bronchiectasis. The sputum was abundant and mucopurulent.

On two occasions smears showed large numbers of acid-fast organisms in the sputum. The remaining examinations, a total of sixty, failed to reveal any acid-fasts. Concentrates and one guinea pig inoculation were also negative. A diagnosis of bronchiectasis was made and it was felt that the organisms obtained in the two positive specimens were not tubercle bacilli. Scrapings from the nose revealed similar organisms. Consultation with the Kalihi Hospital staff revealed no clinical evidence of leprosy. Further study of the organism at both the Leahi Hospital and Kalihi Hospital proved that it was not the tubercle bacillus, the final opinion being that it was a diphtheroid.

CASE 4. A. M. H., a Caucasian-Hawaiian man, aged 49, was admitted to the Leahi Hospital on Oct. 23, 1937. He subsequently died of bronchogenic carcinoma. During the patient's stay in the hospital, and in the course of a large number (forty) of sputum examinations, acid-fast organisms were found on two occasions. Four cultures and one guinea pig inoculation were negative for tubercle bacilli.

CASE 5. U. N., No. 5167, a Japanese woman, aged 36, was admitted to the Leahi Hospital on Dec. 28, 1928. Her chest films, plus persistent findings of acid-fast bacilli by smear in the sputum, led to a confident diagnosis of tuberculosis. This patient died following an operation. Post mortem examination revealed that no tuberculosis was present, but that the pathologic findings in the roentgenograms were due to the presence of a dermoid cyst filled with yellowish, cheesy material interspersed with light-

colored hair. The yellowish material in the dermoid was found to consist of masses of acid-fast bacilli. These organisms were not tubercle bacilli, but their specific identity was not established. Presumably the dermoid cyst communicated with a bronchus, although such a finding is not noted in the record.

NEGATIVE CHEST X-RAY ASSOCIATED WITH TUBERCLE BACILLI IN THE SPUTUM

All in all, cases such as the above are relatively rare. Acid-fasts in the sputum nearly always turn out to be true tubercle bacilli. This having been proved by cultures or guinea pig inoculation, it is evident that a tuberculous lesion must be present in spite of a negative x-ray. Under these circumstances, the lesion nearly always consists of either a caseous hilar gland which has ulcerated into a bronchus, or of a cavity in the subapical portion of a lower lobe²¹.

Caseous hilar glands are much more common than caseous cervical glands. The broncho-pulmonary and tracheo-bronchial lymph glands lie immediately in contact with the walls of the air passages. It is thus not surprising that caseous hilar glands occasionally ulcerate into a bronchus. When this happens, a positive sputum results.

Ulceration of hilar glands has, of course, been seen at autopsy by many pathologists, and the diagnosis may often be surmised clinically. I have seen the syndrome in three cases under observation for hilar gland enlargement, though the majority of cases are probably not recognized clinically. Because of the age incidence of primary tuberculous infection, the syndrome is much more common in infants and small children.

Rupture of a caseous gland into a bronchus commonly results in the more or less abrupt onset of cough, expectoration, and positive sputum. Occasionally, evacuation of a caseous gland into a bronchus gives rise to acute dyspnea and suffocation. Often the episode is quickly followed by rapidly progressing pulmonary tuberculosis if the aspiration is massive, or, if the seeding is not too heavy and the resistance high, by an acute exudative lesion in the lung, one form of the clinical hodgepodge known as 'epituberculosis.' The onset of symptoms may be more gradual if the fistulous communication is of small size, as is probably so in the majority of cases. The complaints may then be of obstinate, not too productive cough, and may suggest that diagnosis of which the physician should always be wary, especially in youngsters, primary chronic bronchitis.

When caseous glands are completely evacuated into the air passages over a short period of time, a highly positive sputum may exist during the period of evacuation. It may then suddenly become much more difficult to find tubercle bacilli in the sputum.

Rapid evacuation of the glands is due to the fact that liquefaction of the caseous material usually precedes the rupture. Liquefied caseous material characteristically teems with bacilli. Following evacuation of this material, the number of bacilli in the sputum sharply drops. However, the abscess cavity of the gland persists for variable lengths of time and will continue to expel tubercle bacilli in diminishing numbers. These are ideal cases for recovering the tubercle bacillus by gastric lavage.

The subapical portion of each lower lobe lies directly behind the hilum in that portion of the lung which rests in the so-called costovertebral gutter. At this subapical level, especially in short or fat subjects, the border of the mediastinal shadow in the x-ray lies considerably lateral to the vertebral column. This means that an appreciable volume of the subapical portion of each lower lobe lies behind, and is obscured by, the mediastinal shadow. (It is to be noted that the apices of the lower lobes lie considerably more caudad in the average postero-anterior roentgenogram than one might imagine from application of descriptive anatomy.) Most cavities in the lower lobes are found in the subapical region. Such cavities may be invisible in postero-anterior films and the remainder of the lung field may be clear. A film taken in the oblique position will clearly reveal such a cavity. Whenever a patient, especially an adult, has a positive sputum with a negative postero-anterior plate, oblique plates, preceded by fluoroscopy for optimum positioning, should always be taken.

Very occasionally a positive sputum with negative x-ray findings will be associated with tracheo-bronchial tuberculosis. It is to be suspected that a good many, if not all, of these cases are secondary to ulceration of caseous glands into the bronchi.

Rarely, a positive sputum is due to tuberculous ulceration of the nasal septum, adenoid tissue, tonsil, pharynx, or tongue. Usually, however, these ulcerations have such definitely localizing symptoms that they seldom give rise to difficulty in diagnosis.

Trudeau and Yeager's report would seem to indicate a very favorable prognosis for patients with positive sputum but negative x-ray findings²². However, in seventy-five of the one hundred such cases which these authors followed, the diagnosis of positive sputum was based on a single finding. Granting that the majority of the acid-fast found in Trudeau and Yeager's series may have been tubercle bacilli, the same favorable prognosis cannot be allowed for those patients with negative x-rays, in whom a positive sputum is repeatedly found. In these cases the early development of a parenchymal lesion is common²¹. Such cases should be followed very closely. Failure of a lesion to develop should arouse suspicion that one is not dealing with the tubercle bacillus.

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Bacillus Tuberculosis---Views Regarding the Diagnostic and Prognostic Importance of Its Presence in the Sputum *

Prologue

D. W. CHISHOLM, M. D.

To understand the first few paragraphs of Dr. Otto Fennel's paper it is important to note that at the time it was written, 1884, Koch's tubercle bacillus had been known for but two years, and that the great Virchow had eighteen years yet to live. The following quotation from the first edition of Osler's *Principles and Practice of Medicine* will explain why the pathology of tuberculosis, or consumption, or phthisis, was a subject for controversy in some minds even two years after the tubercle bacillus had been discovered. Osler states (1892): "Only a great master like Virchow could have won the profession from a belief in the *unity of phthisis*, which the genius of Laennec had, on anatomical grounds, announced. Here and there a teacher, as Wilson Fox, protested, but the heresy prevailed, and we repeated the striking aphorism of Niemeyer, 'The greatest evil which can happen to a consumptive is that he should become tuberculous.' It was thought that the products of any simple inflammation might become caseous and that ordinary catarrhal pneumonia terminated in phthisis. It was peculiarly fitting that from Germany, in which the dualistic heresy arose, the truth of Laennec's views should receive incontestable proof, in the demonstration by Koch of the etiological unity of all the various processes known as tuberculous and scrofulous."

Goettingen, July 29, 1884

EDITORS LANCET AND CLINIC:

Can it not now be accepted as an established fact in the general pathology of phthisis pulmonalis, that all forms of this disease are of tubercular origin? All recent investigations and researches in this field certainly seem to me to establish more and more the truth of this statement. The original distinction of Virchow, separating the caseous pneumonia and caseous bronchitis from the true tubercular form of phthisis, must still be partially upheld on account of descriptive anatomical reasons; nevertheless, this division of processes must be abandoned, not only from existing histological relations, but more especially from an etiological and practical point of view. A careful microscopic examination already showed a similar histological character of the elements in both the forms of caseous pneumonia and bronchitis as in the so-called true tubercle. In all forms of phthisis, even in the non-apparent tubercular varieties, we always find the characteristic submiliary, non-vascular nodules with giant cells which are typical of the fully developed tubercle.

These formerly unknown characteristics of mor-

bid anatomy of phthisical lung have certainly at present much limited Virchow's views of duality of phthisis; the everyday occurrence, for instance, of tubercular pleuritis complicating a case of caseous pneumonia could not any longer be explained as the onset of a new disease (as Virchow and followers taught), but was solely to be explained as an extension of the same morbid process existing in the lungs to its investing membrane. It seems strange that this simple and self-evident explanation of the process, compared with the former views, was so long in becoming established,—yet such was the case.

Several years later Charcot and his school then claim from original and similar observations to have discovered the "unite de la phthisis," and Rindfleisch, in his article upon the subject, arrived at similar conclusions. Finally, Cohnheim and others in still later years in their experimental investigations showed the inoculability of the tubercular virus, and then Koch's great epoch-making discoveries proved beyond the peradventure of a doubt that phthisis and tuberculosis had a common etiological factor and only in very exceptional cases do other causes complicate the morbid change.

Pulmonary consumption must therefore be considered to be in by far the majority of cases a local tuberculosis of the lungs. Consequently, if we find those parasites (which we know to produce tuber-

* Fennel, Otto W.: Foreign Correspondence, The Cincinnati Lancet and Clinic 52:285 (Sept. 13) 1884.

culosis) in the sputum, we must draw the conclusion that a tubercular process is taking place somewhere in the respiratory apparatus (including mucous membrane of mouth and throat). But must we likewise infer that a general tuberculosis will of necessity result sooner or later and the case prove to be a literally hopeless one? No, that would indeed be a grave mistake, for the bacillus is not only found in those cases of tuberculosis in which the process is spreading more or less rapidly, and, eventually, by entering blood and lymph channels, is extended over the entire organism, but likewise in those less severe cases in which it has for years and tens of years been latent (even finally entirely disappeared) [and] in those varieties known as "localized tuberculosis."

In this respect the human organism seems to differ materially from that of the lower animals (experiments upon rabbits and guinea-pigs proving that inoculation, for instance, in the anterior chamber of the eye, with the tubercular virus produces tubercular deposits in the bulbs and general infection rapidly following, the animal perishing from its effects), while in man it is a settled pathological derivation that the process may run for a long period a relatively benign course and even terminate in the disappearance of the original tubercular deposits.¹ It is true that as long as the nidus remains there is always danger of a sudden increase of intensity of process and without any cause that we may determine [it may] take(s) on a sudden local or general extension. The human body, however, appears in the majority of cases to be only a tolerably fertile soil for the bacillus, so that they multiply but sparingly, but if under certain (to us yet unknown) conditions there takes place a rapid development of the parasites there follows necessarily a rapid extension of the process. At present we do not as yet possess a knowledge of those pathological conditions which in many cases retard the development of the germ; could we but create them we would have established the greatest advance in modern thera-

peutics, viz.: the successful treatment of tuberculosis, and although we have at the present time not solved this great problem, the paths to its successful attainment have already been partially opened and we may hope that this high aim will be reached by the continued diligent labor of the investigators in the near future.²

Now, when we find the bacillus in the sputum, we at once prove that a tuberculous process exists, which perhaps may by rapidly extending local destruction and conveyance to other organs become eminently dangerous to life, but again which may run a very slow bland course, the original deposit even undergoing secondary degeneration and disappearance.

The diagnosis of pulmonary consumption, verified by presence of the bacilli, is now often made, when formerly only a doubtful one was possible. The bacilli are found on the surface of every, even the smallest, phthisical cavern, on tubercular defects of the bronchi, etc., in large numbers. They are found much more easily and readily in the sputum than the elastic fibres, by means of which only heretofore destructive processes in the lungs were ascertained, because of their well-marked properties of taking up certain coloring agents, by means of which they are at once brought into prominent view possessing their characteristic outlines and isolated colors. We can, therefore, by a careful examination of the sputa, recognize those numerous lighter cases of phthisis which terminate favorably and were formerly diagnosed as "suspicious" pulmonary catarrhs, bronchitis, etc., indeed even those cases which exhibit only slight subjective symptoms. And we see best from the dissecting table how eminently numerous are these cases of phthisis with a favorable termination.

² Otto Fennel would perhaps be greatly surprised could he know that even today we have no specific measures for the treatment of tuberculosis. It is true that we have learned of the tremendous importance of variable individual allergy in response to the tubercle bacillus. We know that allergy has much to do with the type of tuberculous pathology (exudation, caseation, productive, or mixed reaction) manifested by any one individual. However, about the only therapeutic lesson we draw from this knowledge is in the line of prevention: Avoid progressive disease in the highly allergic, primarily infected individual (commonly an infant or small child) by preventing frequent reinfection by removing that individual from the source of infection—commonly a parent.

¹ In the light of present-day knowledge of the pathogenesis of tuberculosis, it is evident that in this paragraph Otto Fennel is failing to distinguish between primary tuberculous infection in animals and secondary or reinfection tuberculosis in man. Primary inoculation (infection) in man follows the same course as primary inoculation in animals, i.e., it is followed within a matter of hours by a tubercle bacillus bacilleamia which continues, probably intermittently, for a variable number of days until such time as the reaction of a developing allergy localizes the organisms. The end result of this primary hematogenous dissemination varies with the specific host. In man the dissemination only occasionally results in either immediate or late progressive disease. Such metastatic foci as are set up are abortive. In the guinea pig this primary dissemination nearly always leads to fatal generalized tuberculosis.—D.W.C.

The relationship between allergy and immunity in tuberculosis is still controversial. Until we know more about this relationship, and much more about the individual factors of allergy and immunity, we are at a loss to adequately explain individual and racial variations in resistance to the tubercle bacillus.
—D.W.C.

In apparently healthy, strong individuals, adults, who have met their death suddenly from some accident, acute disease, etc., we find by a more searching investigation in almost half of all cases the signs and remains of a phthisical destructive process in the lungs, and that in the form of cheesy, often calcareous, incrustated masses, with cavity formation, surrounded by indurated cicatricial tissue. Now many of these cases have run their course perfectly latent, at least the majority of them have never caused the slightest suspicion of a pulmonary affection; but, again, in each and every one, the bacillus tuberculosis could have been proved to have been present at a certain time.

However, that from these cases, to outward appearances terminating favorably and the process involving but a small area, there can suddenly develop a tubercular pleuritis, indeed a fatal tubercular meningitis, etc., is well known to all experienced physicians and is only too often proved by clinical practice and subsequent autopsies.

Having detected presence of the bacilli in the sputum we are always forced therefore to make a grave but not of necessity fatal prognosis. For it is a well known fact, that even rapidly spreading phthisical destruction in the lungs under favorable circumstances may come to a halt and that not every case of phthisis incipiens must cause great destruction of pulmonary tissue. The detection of the bacilla [*sic*] in the sputum is of especial and increased value in diagnosing tubercular affection from the fact that they are already found in the early state of the disease when other signs and symptoms are not well marked; (we find this to be the case in our clinics and poli-clinics [*sic*] here at Goettingen from careful observation) of great importance I wish to add, as in the treatment everything depends upon the diagnosis and consequent steps being taken in the earliest stages of the disease when the lives of many patients can be saved by combating its future ravages by the only means we as yet possess that is proper regimen, hygienic surroundings, mode of living, climate influences, etc.³ The relation between the quantity of bacilli in the sputum to the severity of the pathological process has not yet been definitely determined to any degree of certainty.

³ How true this latter statment is even today. There are few cases of minimal tuberculosis that cannot be cured by "proper regimen, hygienic surroundings, mode of living." The treatment of more advanced cases by collapse measures, as pneumothorax, phrenic nerve paralysis, pneumoperitoneum, and thoracoplasty, has been a major therapeutic step but obviously merely a mechanical method of applying more effectively the rest implied in Otto Fennel's "proper regimen." D.W.C.

But on the other hand the constant absence of the tubercle-bacillus in the sputa may be assumed as a certain proof that tubercular-phthisical destructive changes are not then occurring in the pulmonary organs. If elastic fibres are found in the sputum, and no bacilli, we are forced to conclude that other destructive processes such as degeneration of tumors, opening of abscesses, etc., are going on in the lungs.

We must not forget to mention, however, that certain chronic ulcerative processes occur in the lungs that are not of tubercular origin and consequently no bacilli are found, these cases are very exceptional and embrace those diabetic sloughing processes of the pulmonary parenchyma first described by Reigle; but in the majority of the diabetic phthisis cases abundant bacilli are found. The pathological change resembles very much, in those cases in which the bacilli are absent, that occurring in the ordinary form of tubercular phthisis.

In the examination of the sputa for bacillus-tuberculosis, it ought to be understood that only the best methods, those that give the most accurate results, should be employed. It is quite true that they can be discovered in some specimens with low magnifying glasses, indeed if they are very numerous, they can occasionally at once be recognized with the naked eye itself by their power of taking up certain colors but in spite of these known facts it would be a great mistake to use any but the very best immersion lenses in bacillus-tuberculosis researches, as it is quite a common occurrence and we often have had the experience here in the laboratories, that the bacilli present in the specimen prepared for the microscope are not found in the field by means of the weaker lenses (viz. dry lenses) yes, entirely overlooked, but are at once clearly visible when higher magnifying lenses (lowest we use is 600) are employed instead. It is at least quite impossible to form a definite negative opinion in regard to the bacillus tuberculosis without the use of the best immersion system of lenses, above all the oil-immersion and Abbe's apparatus so highly recommended by Koch. He who fears the expense of these most necessary auxilliary [*sic*] means and the increased amount of more accurate labor should at once withdraw from the field of schizomycete investigation, as without them his derived results will be of comparatively little value and of very doubtful significance.

The manner in which we find and color bacilli rapidly and obtain the best results and specimens is a modification of the Koch-Ehrlich-Orth method, and may be given as follows:

1. Spreading out of the sputum on a black painted plate and picking from this an opaque whitish or grayish white particle by means of two platinum

needles (brought to a glowing heat just before using).

2. Spreading or rather rubbing up of the particle between two, (resp. more,) cover glasses of 13-18 mm. thickness so that a thin, even layer is obtained about as thin as required in blood examinations. The cover glasses are not to be lifted but rubbed apart.

3. Then the cover-glass is carried through a spirit lamp three or four times and about as rapidly as the knife is moved in the act of cutting bread.

4. A few minutes shaking up of aniline oil with distilled water in about the proportion of 5-100, then filtered through a moistured filter into a porcelain dish (aniline water).

5. Addition to above solution of a filtered oversaturated one of gentian violet in 90° alcohol, until a well marked opalescence occurs and then thoroughly stirring mixture with glass rod (for every 10 c.c.-m. of aniline water about 15 drops of the gentian violet coloring solution are required).

6. Now we either allow the prepared cover glasses to swim on the surface of this solution for twenty-four hours (if longer no harm is done) or we place the porcelain dish with the swimming glasses (I usually make six specimens from one sputum) on a triangle covered with a wire net over a spirit lamp and continue to heat until small, bursting bubbles form on the surface of the fluid or speaking more accurately and thermometrically up to 80° c. and then let them stand for a few minutes.

7. Removal from the liquid and prepared as follows: having removed the coverglass with a small

forceps, we absorb the now unnecessary coloring solution from the surface by means of blotting paper and dip it into a solution of Hydro-chloric alcohol (100 c.c.m. alcohol, 20 c.c.m. distilled water and 20 drops concentrated Hydrochloric acid) allowing it to remain about a half minute. Now, we pass it through 90° pure alcohol until even the faintest trace of the blue color has disappeared (1-2 minutes) and wash it off with distilled water.

8. Whereupon the coverglass is placed prepared side upwards and allowed to dry, which is hastened by blowing through glass tube. Finally by means of an eye-dropper 4-5 drops of a concentrated watery solution of vesuvian are dropped upon it (to prevent formation of mould in the vesuvian solution I usually add a small piece of camphor when it can be kept indefinitely). After two minutes it is again, thoroughly washed in distilled water, dried removed upon a 1-2 m.m. thick object glass, and examination is simplified if a drop or two of distilled water is added just previous to placing it under the microscope or if it is to be put up permanently as a specimen either Canada balsam or Damar varnish answers very well.⁴

OTTO W. FENNEL, M. D.

* After reading this paper one can visualize the earnest mind of Otto Fennel, still slightly troubled by Virchow's dualistic heresy, struggling for precise knowledge and exact methods. How delighted he would be to play around with modern concentration and culture methods, with fluorescent dyes, and with all the new scientific instruments in a modern tuberculosis hospital from which most of the patients are discharged alive and well instead of dead.—D.W.C.

Comment

R. N. PERLSTEIN, M. D.

This letter of Dr. Otto Fennel to the Cincinnati Lancet and Clinic is a historical document of great interest and importance. Its author reveals himself as a scholarly person whose knowledge of the subject was profound and whose mind was capable of accepting and correctly assessing a new revolutionary discovery. It must be remembered in this connection that the study of tuberculosis was very old historically even in the year 1884 and many of its concepts and votaries heavily calcified. It took a whole galaxy of young men, many of whom were in the category of genius, to break down the old fixations and to establish a clear etiological picture of tuberculosis.

Chief among these, and a master of clear thinking and brilliant methodology, was Robert Koch, the centennial of whose birth occurs on December 11th of this year. But to appreciate the men who worked in this golden age of Germany and of medicine, one must go to the biographies of two of our great Americans, William Henry Welch and Hermann Biggs. Welch was in Cohnheim's laboratory in Breslau in 1876 when Koch demonstrated the life cycle of the anthrax bacillus and remembered the tremendous enthusiasm of the professor and his prediction that this was "the greatest discovery of modern times."

He was not far wrong. The men present on these two occasions (there were two such demonstrations) were witnessing the acouchement of a lusty infant—bacteriology. With the enthusiastic support of the botanist Cohn, and the first great experimental pathologist Cohnhelm, and with the new stains of Weigert and Ehrlich, Koch spent the next few years as an assistant in the Kaiser Wilhelm Institute in Berlin, working on the bacteriology of wound infection. In the summer of 1881 he began his work on the etiology of tuberculosis. On March 24, 1882 he read a paper to the Berlin Physiological Society under simple title "Ueber Tuberkulose" and published it in the April 10th issue of the *Berliner Klinischer Wochenschrift*. The title had been changed to read "Etiology of Tuberculosis." It still remains a model of the perfect scientific paper. All the requirements of scientific exactitude were met. The organism had been isolated, stained, identified and named. It had been cultured and inoculated into animals; had given them the same disease and had been recovered from their body tissues.

The effect of this discovery was electric in most circles of the medical world. There were many sceptics both in and outside of Germany. The great Virchow was not convinced. Austin Flint in New York received the news with great enthusiasm. Loomis in the same city said "The bacterian theory, which so recently has occupied the attention of medical men, especially in Germany, is rapidly being disproved, and consequently is rapidly being abandoned." Loomis would peer around him while lecturing and remark with heavy irony "People say there are bacteria in the air, but I cannot see them." The Illinois State Medical Society reported to its members that Koch's bacillus was probably "only one of the mere accompaniments of certain deteriorative changes in organic matter and possessing no causa-

tive relation whatever and that there is therefore nothing in the present status of investigations on this subject that will either justify the isolation or quarantine of the victim of tuberculosis, the disinfection of his sputa, or the expectation of curing him by germicides. These remarks apply equally well to nearly all the other diseases with which some variety of bacterial germ has been associated." Lastly a medical gent named Farmad in Philadelphia produced the following bit of Americaniana. "A great deal of good pathological work is done in America. Admiration of European pathological works is certainly justifiable but this forms no good reason why the good honest work of Americans, even that of young men, should be left unnoticed."

It is important to remember only that Otto Fennel was among those who accepted and learned and that he reported his information lucidly and well from that very Goettingen where Koch graduated in medicine. He wrote with a rare degree of scientific background and with probably more restraint than his son would have exercised in his place.

The last published paper of Robert Koch was produced in 1910, the year of his death, and is on the epidemiology of tuberculosis. It is as nearly perfect as any of his works. It gives mortality figures of Prussian cities. It points to the difficulty of obtaining reliable morbidity figures (this is still true). It discusses crowding, bad housing, bad hygiene as causes of tuberculosis among the poor whose scourge it has always been. In the clear incisive style which was his, it points to the simplest method of ridding a community of tuberculosis—the building of facilities for the isolation and cure of all open cases and their conscientious retention and treatment in such institutions until they have been rendered non-infectious. Perhaps here, too, he was right.

Epilogue

E. A. FENNEL, M. D.

My father died in 1908, three days before I entered medical college. Of course, I knew he was a doctor, but I did not know whether he was a good one or a poor one. It is very gratifying therefore, after these many years to stumble across these writings of his and to find his then mode of thought and conclusions so basically correct even in the face of the great forward strides in the study of the tubercle bacillus, and its results, made since then. If he could come back for a while, how I would enjoy showing him how we do things now—the reading of technically perfect chest x-rays, the modern cultural methods, the beautiful specimens of tissue made possible by the newer staining techniques. I would enjoy showing him his own little microscope which we still use to control staining. But most of all would I enjoy showing him the results of modern therapy—his "proper regimen" of nearly sixty years ago.

Cigarette Smoking as a Factor in Sterility

LYLE G. PHILLIPS, M.D.

Honolulu

Various intoxications have been suggested as etiological factors in sterility in the human being by various authorities, and in some writings excessive use of tobacco has been mentioned as a possible cause of infertility. Careful search of available literature by this writer has failed to bring to light any definite evidence previously recorded in support of this assumption. However, the following case history suggests that cigarette smoking may sometimes be responsible for sterile mating.

CASE REPORT

Mrs. R. M., age 27, sought advice in September, 1937, in regard to her failure to become pregnant. She had been married five years, and during the first two years of her marriage had used a diaphragm pessary for contraception but for three years had employed no contraceptive measures.

Her past history was insignificant except for a mild attack of pleurisy in 1930. Her health since that time had been consistently good. Her menstruation began at the age of 14 and her periods had been regular at all times, with a 28-day cycle and a normal flow lasting usually four or five days. No abnormal discharge had ever been noticed. Her usual weight was about 95 pounds. Her diet was adequate in all essentials. Her only operation was a tonsillectomy.

Her general appearance was that of a healthy young woman. Her blood pressure was 110/68. Physical examination revealed no apparent abnormalities. Examination of the pelvic organs indicated apparently normal development. The cervix was clean, without evidence of infection, and otherwise normal. The uterus was of normal size, shape, consistency, and mobility. The adnexae appeared normal to palpation. Cervical and vaginal secretions were of normal alkalinity and acidity respectively. Her blood count was normal. Urine was normal, and her basal metabolic rate was normal. Wassermann and Kahn and sedimentation tests were negative.

The Huhner test was performed on September 18, one-half hour after coitus. Secretions removed from the vaginal vault contained well-formed sperm

in apparently normal numbers, but none showed any motility whatsoever and all were apparently dead. On September 20, sperm collected in a well-washed condom likewise contained myriads of sperm, all apparently dead.

The Rubin test, performed September 27, 1937, indicated that both tubes were normally patent.

The husband, R. M., age 33, was subjected to thorough examination. He was apparently in good physical condition, without symptoms of any kind, and without apparent physical abnormality. He was a robust individual and his only departure from exemplary habits was the use of from 20 to 30 cigarettes a day. Blood and urine examination were negative. His Wassermann and Kahn were negative. Sedimentation rate was 3 mm. in 60 minutes. His diet as described was adequate in regard to essentials. His basal metabolic rate was minus 2 per cent.

In the absence of any apparent explanation of his production of abnormal sperm, it was suggested that he stop smoking in order that the effect might be noted. He complied, and after November 1, did not smoke. On December 1, a semen specimen collected in a washed condom was examined and found to contain well-developed motile sperm in normal numbers.

Mrs. M. menstruated in December and January, but her February period failed to occur. During these months Mr. M. did not smoke. On October 14, 1938, Mrs. M gave birth to a normal male child.

In February, 1939, Mr. M., who had resumed smoking and was using about two packages of cigarettes a day, was requested to submit a semen specimen. This was brought to the office in a well-washed condom immediately after intercourse and was found to contain, as before, well formed, mature appearing spermatozoa in normal numbers, but all apparently dead. Mr. M. agreed to forego smoking and to repeat the test one month later, and on March 12, 1939, mitted a semen specimen containing large numbers of well formed, mature spermatozoa, all normally active and motile.

SUMMARY

Evidence is submitted in the above case report tending to indicate that in this case, cigarette smoking was apparently a factor in causing infertility.



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EDITORIALS

PRENATAL SEROLOGIC TESTS FOR SYPHILIS

The record of the 1943 Hawaii Legislature as far as medical legislation is concerned was not all bad. House Bill No. 316, now Act 219 of the Session Laws of 1943, "an act to prevent congenital syphilis . . .", was a wholly praiseworthy piece of work. It should indeed go far toward the prevention of congenital syphilis. What it requires, in brief and non-legal language, is about as follows:

Every physician attending a pregnant woman shall take a blood sample at the time of the first visit or within fourteen days and shall send it to an approved laboratory for a standard serologic test for syphilis. Midwives and similar attendants must arrange to have such specimens taken for them. The laboratory makes its report immediately to the physician and once a week to the Board of Health. When the physician reports the birth or still birth of a child he must state whether the test was made and when.

As we go to press, certain details regarding the administration of the act have not yet been worked out. An "approved laboratory" means one approved for this specific purpose by the Board of Health. At present only Board of Health laboratories and those operated by the Army and Navy are in this category. Other civilian laboratories may apply for such approval, which will be granted on the basis of past or present evidence of ability to perform serologic tests with satisfactory accuracy.

There is to be a special printed form on which laboratory reports will be submitted. The birth certificates are also to be altered to provide space for recording, not the result of the test, but merely the date it was taken; for the present this information may be written on the back of the certificate.

Failure of either the patient or the physician or other attendant to comply with the provisions of this act is to be considered a misdemeanor and punish-

able as such. Specific punishment is provided for persons guilty of misusing or divulging information obtained by the operation of the act. The act further specifically empowers the Board of Health to promulgate such additional rules and regulations as may be found necessary for its more effective enforcement.

The firm enforcement of the provisions of this act should certainly drive the incidence of congenital syphilis in the Territory rapidly toward the zero mark during the next few years.

CONTINUOUS CAUDAL ANESTHESIA IS NOT SAFE—YET

It is most unfortunate that the recent advances in the use of caudal anesthesia in obstetrics have been written up in the lay press in such dramatic style, glorifying the "new discovery" as a boon to all expectant mothers. The press would have mothers believe that all there is to it is for the doctor to stick a needle into her sacrum and presto, her pains stop completely while she goes on entertaining friends and finishing her dinner tray just in time to be moved into the delivery room so she can have her baby. Even the local press here got quite excited about this "discovery" and wanted statements from the author about God's new gift to painless childbirth; no such press releases were given out.

Caudal anesthesia is not new to the medical profession and it is not new in obstetrics, having been used intermittently for the past thirty years. The only thing that is new is the idea of connecting the needle to a large supply of analgesic solution and injecting an additional dose when the previous one has begun to wear off. It sounds simple and fool-

proof, but we must all remember that no form of anesthesia is so entirely without risk. This is perhaps doubly true of obstetrical anesthesia. Any and all procedures in obstetrics must be weighed in terms of *safety* to the mother and child; all other laudable features a procedure may have must certainly come in as secondary considerations.

Let us get this clear: *Caudal anesthesia is not yet a safe procedure.* In Baltimore, where much of the original work was done on caudal anesthesia, the procedure was dropped some four years ago when three maternal deaths were traced directly to the type of anesthesia used. Last year Hingson and Edwards published their article in the Journal of the American Medical Association giving their series of 589 cases with apparently no troubles at all; in the very same issue was another article on the same subject by Gready and Hesseltine with a very much smaller series of cases in which they got into plenty of trouble. There will undoubtedly be a flood of literature on the subject because it is an appealing one, and public clamor will probably prompt many physicians to give it a try; lay magazines will probably add further confusion by extolling the virtues, but failing to mention the vices.

From Sinai Hospital in Baltimore comes an article on the subject by Block and Rochberg, in the April issue of the American Journal of Obstetrics and Gynecology, which is most illuminating. They used novocaine instead of metycaine solution and modified the procedures of Hingson and Edwards by using a continuous drip instead of repeated injections of solution. In one case they used 900 cc. of solution without untoward effects. The series of cases was only 39. The article starts off just fine and one is impressed with the simplicity of the procedure, the marked relief given the patients and the evident proof they show that labor was very materially shortened in practically every case; cases of cervical dystocia simply melted away and surgical deliveries were done with ease and without further inhalation anesthesia. It sounded like Utopian contribution to the problem of obstetrical anesthesia.

But wait! Further in the article we come to "*Complications*" and there we see the back-wash which seems to overbalance any and all advantages the method might have. In this small series of cases "nausea and vomiting, dizziness, drowsiness, and in one instance, diplopia" were noted in that order of frequency. Low back pain during the first 24 hours was a frequent complaint and was often so severe as to require one or two doses of morphine for relief. Two cases of apparent neuritis were encountered with severe pain persisting for two weeks. *Five needles were broken off!* The 39th case in the series was the real hair-raiser and it is worth quoting the case history here briefly:

A 22 year old primipara at term was admitted in early labor with 3 cm. dilatation, with a cervix 50 per cent effaced and with the vertex at the level of the spines. Pains were fairly strong and they recurred every three to four minutes. The fetal heart was heard in the RLQ and was of good quality. The fetus was in ROA. After an enema and voiding, she was put in the knee-chest position and a 17 gauge needle introduced into the caudal canal. Suction was made with a syringe and no spinal fluid obtained. Since the patient was complaining of her pains quite frequently she received 10 cc. of the 1 per cent novocaine as the initial dose and then the apparatus was hooked up so that she could get a continuous slow drip from there on.

After five minutes the patient began to complain of some tingling in her feet, a common symptom with caudal anesthesia, but she was able to move her toes. Shortly thereafter, she suddenly lost the power of speech, became very cyanotic, and went into collapse. The patient had respiratory paralysis and her blood pressure and radial pulse disappeared. She was given artificial respiration until she could be intubated and then her respirations were maintained with oxygen through the intratracheal tube. Caffeine, coramine, and adrenalin were administered, as well as heat and intravenous fluids. Respirations were not re-established for 45 minutes, and she had spinal anesthesia for six hours. The caudal had been discontinued at the first signs of distress, but this was not before the patient had received a total of 30 cc. of procaine solution. The patient returned to consciousness one and one-half hours later, and ten hours later she delivered a living child. The mother and baby made an uneventful recovery and were discharged on the tenth day in good condition.

The authors concluded that "no matter how the procaine is administered, the danger of an anesthetic death is still a very real one" and from the one case quoted, one may readily see how they were thus impressed. They further recommend that *the procedure not become routine*, particularly in the small hospital where a competent anesthetist is not always available to cope with the serious complications resulting from accidental introduction of the anesthetic agent into the spinal canal.

Adams, Lundy and Seldon of The Mayo Clinic (J.A.M.A. 122:152 [May 15] 1943, have reported an alternative and probably a safer technic involving the use of a ureteral catheter to replace the needle, the latter being withdrawn after serving as a guide for the introduction of the catheter into the caudal canal. This is a valuable contribution but it does not by any means render the procedure a perfectly safe one or a suitable one for the small hospital. The risks of intravenous or subdural injection and of trauma and infection are still present.

Caudal anesthesia may yet prove a valuable addition to our obstetrical armamentarium but it will require much more research before it is put to general use and then only with a full understanding of its limitations and risks. I doubt now whether it will stand the tests of time.

O. LEE SCHATTENBURG, M.D.

TUBERCULOSIS SURVEY IN HAWAII SCHOOL PERSONNEL

Dr. Wm. F. Leslie and Dr. M. L. Chang, of Puumale Hospital, completed in May a tuberculosis survey of all employees of the 'Big Island' school system, financed by the Territorial Tuberculosis Association. They examined 796 persons, 785 of them successfully (11 plates were unreadable and have not yet been repeated), of whom only 3 were already known to be tuberculous.

Of the 782 remaining persons, 38—nearly 5 per cent had significant lung findings, as follows:

- 17 Suspected tuberculosis
- 7 Healed pleurisy
- 1 Greatly enlarged hilar node
- 16 Definite Tuberculosis
 - 8 Minimal
 - 2 Probably arrested
 - 4 Active
 - 2 Dynamic status unknown
 - 8 Moderately advanced
 - 1 Probably arrested
 - 4 Active
 - 3 Dynamic status unknown

Each of the 38 cases was informed of the result of the x-ray and was referred to his or her private physician with specific recommendations for management. In 9 cases hospitalization was recommended.

In 24 cases definite evidence of cardiovascular disease was noted in the films—including 2 aortic aneurysms.

The total cost of the survey was approximately \$1100, exclusive of the time given by Dr. Leslie and Dr. Chang. Considering only the 9 cases requiring hospitalization for tuberculosis, the average cost was only \$122 per active case.

In line with the editorial comments in the last issue of the JOURNAL, a tuberculosis survey of food handlers on Hawaii is about to be undertaken.

FOOD HANDLERS' CERTIFICATE: II

To the Editor:

I have just read the editorial in the January-February HAWAII MEDICAL JOURNAL on Food Handlers' Certificates, and I would like to let you know that I agree with you 100 per cent.

I am speaking primarily of the tuberculosis side of the picture. Anyone who spends much time doing TB work in this territory is eventually forced to the conclusion that food handling is a hazardous occupation, at least so far as the acquisition of tuberculosis is concerned. This statement sounds

funny but it is not meant to be so at all. If you will speak to any of the Leahi gang, they will tell you that a higher percentage of cooks and waiters eventually find their way into the hospital than any other single occupational group. For a long time, it used to be a standing joke, whenever an admission film showed a far-advanced lesion, to inquire what branch of food handling the individual belonged to. I could quote you any number of case histories similar to the one you mentioned. The prize one, I believe, is that of a patient with far-advanced tuberculosis who left the hospital against advice and, as he himself told me, he was too weak to do heavy work, so he opened up a small restaurant. He had to go to three doctors before he found one who would sign a food handlers' permit but the last one was all that counted. Undoubtedly, he spread quite a few bugs around before he broke down completely and had to re-enter the hospital.

My experience since I have been on this island has shown that conditions here are no better than they are on Oahu. Seven per cent of our admissions here last year were cooks or waiters and not one of them was picked up when he applied for a food handler's permit and all of them had considerably more than minimal involvement.

I have felt for a long time that a survey of food handlers with x-rays would be an ideal thing and I have talked the local Tuberculosis Society into financing such a survey.

At a meeting held at Leahi about two years ago to discuss the food handlers' problem, Dr. Haralson stated that it should not be a problem of the Board of Health to rule out TB in these cases but should be left up to the private physician who signs the permits. I absolutely disagree with this for two reasons. For one thing, the best chest specialist in the world cannot diagnose a minimal case with only a stethoscope, and if the individual does have enough involvement to enable a diagnosis to be made by the present method of examination, he can shop around until he finds some doctor who is willing to sign the certificate.

I should personally like very much to see the medical societies, both local and territorial, take a definite stand on this issue and begin to exert a bit of pressure on the Board of Health so that the recommendations you made in your editorial are carried out.

In any event, I am glad that at least one more physician agrees with me that the present system of examining food handlers is a lot of bunk.

WM. F. LESLIE, M.D.

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PROGRESS IN INTERNAL MEDICINE

THERAPEUTIC NOTES ON A FEW NEW DRUGS

Sulfadiazine

Sulfadiazine has been established as the most widely effective and least toxic of the sulfonamides by reports covering wide clinical use. Finland et al¹ suggest the following field of usefulness for the drug: "... all cases of hemolytic streptococcus infection; all of the various acute bacterial meningitides; acute gonorrhea; acute infections of the urinary tract; acute pulmonary infections including those caused by the pneumococcus and streptococcus, and probably also the staphylococcus and Friedlander's bacillus."

Toxic effects attributable to the drug are relatively few and usually mild. Urinary suppression from crystal blockage may occur, and if not promptly recognized and adequately treated may be fatal. Agranulocytosis has been reported. Drug fever, episcleritis and erythema multiforme occur. An editorial comment in this same journal quotes Long's personal communication as follows: "Long found the following incidence of serious toxic effects such as drug fever, dermatitis, acute hemolytic anemia, granulocytopenia, renal complications, hepatitis, peripheral neuritis, and psychosis: sulfathiazole 18.6 per cent, sulfapyridine 15.9 per cent, sulfanilamide 11.9 per cent and sulfadiazine 6.5 per cent."

Succinyl-Sulfathiazole

Succinyl-sulfathiazole (Sulfasuxidine) is a new member of the sulfonamide series. It is similar to sulfaguanidine in its slow absorption from the gastrointestinal tract and its low toxicity. Its particular field of usefulness appears to be in the treatment of infections of the intestinal tract, such as bacillary dysentery, and as an adjunct to surgery of the large bowel. Evidence of its effectiveness in this latter field is reported by E. J. Poth².

Promin F

Will any of the sulfonamides prove of value in the treatment of tuberculosis? Experimental work has suggested that Promin may have some value in this disease but clinical confirmation so far has been lacking.

Feldman et al³ demonstrated that Promin has definite deterrent action on, i.e., its use results in

lessened spread and changed character of lesions of tuberculosis induced in animals. Barach et al⁴ report favorable results from administering Promin orally to experimentally infected guinea pigs. Still greater deterrent effect was obtained in animals by inhalation of nebulized Promin.

No such favorable results were obtained by Zucker et al⁵ in human patients with relatively early nondestructive tuberculosis. Administration was by intravenous drip. Adequate blood levels were obtained and the course of four weeks' treatment was repeated in 5 of 12 patients. Adequate trial of treatment was therefore given, and though only relatively mild toxic reactions occurred, no beneficial results were observed except the unexpected healing of one case of tracheo-bronchial tuberculosis.

Penicillin

Antibacterial substances derived from fungi and other microorganisms offer new possibilities for the cure of infectious diseases, somewhat reminiscent, perhaps, of bacteriophage. The new interest goes back to the work of DuBos who in 1939 described the isolation of a metabolic product of the soil bacillus (*B. Breus*) which possessed a very high degree of bactericidal activity against gram-negative organisms. Later a fraction was found which proved to be effective against both gram-positive and gram-negative organisms. This substance, Tyrothricin, has a limited field of usefulness because of its hemolytic action.

Penicillin, a substance extracted from culture of the fungus, *Penicillium notatum*, is apparently effective against a wide variety of microorganisms. Unlike drugs of the sulfonamide series, its bacteriostatic action is not interfered with by body fluids or by pus, and only to a limited extent by very large numbers of organisms. It has low toxicity to tissue cells and may be administered safely by parenteral routes. It is inhibited by acid gastric juice and is rapidly inactivated in the body.

Favorable therapeutic responses (but no cures) were reported by Abraham et al⁶ in several apparently hopeless cases of staphylococcus and streptococcus septicemia, after other measures had failed. Penicillin accomplished sterilization of the urine in a case of serious staphylococcus aureus urinary tract infection when administered by mouth. Applied lo-

cally to the eye, it was effective in controlling infection resistant to other measures.

Difficulties of production, standardization and administration appear obvious in this report and much more investigative work will be necessary before the place of Penicillin in our therapeutic armamentarium is established.

Digitalis

Variations in potency of digitalis are noted in recent articles about cardiac drugs. Following the change of assay method of the U.S.P. XI revision of 1936, many preparations of digitalis increased in potency to as much as 150 per cent of older preparations. The forthcoming twelfth edition of the U.S. Pharmacopoeia provides assay by the cat method and a drop of potency of about 25 per cent over present strength is anticipated in many products. Human assay as proposed by Gold⁷ may be the next logical step. Meantime, in practice, since there are variations not only in drug potency but in individual response, it is necessary for the physician to observe clinical effects very carefully in each patient. The method of administration selected depends upon the patient's need for rapid or slow digitalization as the case may be.

A digitalis glucoside, Digitoxin (Digitaline Nativelle) has been restudied by Gold⁷ and found to be safe to administer by a single therapeutic dose to patients who have had no previous digitalis and are in urgent need of digitalization. Vomiting was induced in only 1 out of 50 patients with the glucoside, as compared with 1 in 5 with digitalis. Full therapeutic effects were obtained in from six to eight hours. The glucoside is effective in relatively small doses because of complete gastro-intestinal tract absorption. The full therapeutic dose is of the order of 1.25 mgm., or only 3 cat units, as compared with an average of 15 units of digitalis leaf or tincture.

Dicoumarin

Dicoumarin, an orally effective anticoagulant, was synthesized by O. A. Meyer⁸ and his associates at the University of Wisconsin to resemble the effective hemorrhagic agent obtained from spoiled sweet clover (which causes hemorrhagic disease in cattle). The chemical name of the substance is 3,3'

methylenebis (4-hydroxycoumarin). The name Dicoumarol has also been applied.

Its action is to delay blood clotting, chiefly by prolongation of prothrombin time. It also impairs clot retraction and increases red blood cell sedimentation rate. The action is somewhat delayed but is accomplished readily by oral administration. This latter feature and its low cost are its principal advantages over heparin. Blood transfusion readily counteracts its hemorrhagic effects.

The principal uses suggested for this new drug are as a prophylaxis against postoperative thrombosis and embolism and the treatment of pulmonary embolism and of thrombophlebitis. In spite of a number of favorable reports of clinical application, the field of usefulness of this drug and its details of administration have not yet been established.

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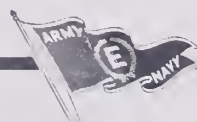
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APPENDICITIS SIMULATING MALIGNANCY OF THE CAECUM

Appendicitis as the cause of inflammatory mass in the right lower quadrant which may be mistaken for malignancy, tuberculosis of the caecum, regional enteritis or actinomycosis has received scant mention in recent medical literature.

Mention is made in Kelly and Hurdon's book, *The Vermiform Appendix and its Diseases*, of a report by A. Gerster in the New York Medical Journal in August, 1902, of such a case. A man of 20 presented the following points of resemblance to a neoplasm of the ileocecal region: a large rounded tumor of gradual development, movable, giving very little pain when patient lay quietly in bed, and not accompanied by chills nor rise of temperature, the bowels being regular. The chief points in favor of the inflammatory nature of the tumor were the age of the patient, and especially the history of three previous attacks suggestive of appendicitis.

In the Surgical Clinics of North America for February, 1936, Christopher discussed inflammatory tumors of the caecum simulating acute appendicitis. Three cases were cited: one was regional ileitis, one was a carcinoma in the caecum in a male of 28, and the third was diverticulitis of the caecum. He drew attention to the fact well known to all of us that an appendectomy may be one of the simplest or one of the most difficult operations in surgery, and also that one must be prepared to deal with other pathological conditions in the right lower quadrant whenever a patient is brought to surgery with a diagnosis of appendicitis.

Differential Diagnosis

As a rule, new growths of the caecum are more or less freely movable, are more sharply circumscribed, and develop gradually, while an inflammatory mass is less movable, less clearly outlined, and develops more rapidly with acute local findings of tenderness and rigidity, and associated with fever and leukocytosis. A malignancy of the caecal area is also more likely to be associated with change in bowel habits, with partial intestinal obstruction, with anemia, with gross or occult blood in the stool, and with filling defects as shown by barium enema. These findings may not be sufficiently distinctive in any given case to permit of a differential diagnosis and only by exploratory laparotomy can the true nature of the condition be determined.

Diverticulitis of the colon, particularly of the

sigmoid area, commonly gives rise to an inflammatory mass that cannot be differentiated preoperatively from malignancy. This is of less frequent occurrence in the caecal region, because diverticula occur more rarely in this area. The three following case reports of inflammatory lesions in the caecal area, the result of appendicitis, illustrate the points just discussed.

Case Reports

CASE 1. Queen's Hospital, No. 93574. In August, 1935, a Japanese woman, age 48, was referred from Kauai by Dr. Marvin Brennecke with a provisional diagnosis of carcinoma or granuloma of the caecal region. Several weeks previously the patient had noticed some abdominal discomfort in the right lower quadrant, and on examination a tumor had been palpated in this area. There was very little tenderness in this region, and no muscle spasm. The highest temperature on several occasions was 99.2 F. Two months previously she had apparently passed chyle in the urine but none was present at this time and the urine was otherwise normal. Cystoscopic examination and pyelograms were negative. Urine cultures were sterile. Pelvic examination was negative; the tumor was lying higher than one would expect from a tubo-ovarian involvement. Barium x-ray studies showed a slight filling defect in the region of the caecum.

Operation, August 13, 1935: Under spinal anesthesia a right rectus incision was made. A mass was encountered along the inferior edge of the caecum and terminal ileum that was at first interpreted as being due to malignancy. However, on exploring the appendix it was found to curve around beneath the ileum, and to have ruptured near the tip. There were 1 or 2 cc. of pus in this region, with a large amount of surrounding inflammatory reaction. Removal of the appendix was followed by recovery. Microscopic examination of the appendix revealed only inflammatory reaction.

CASE 2. Queen's Hospital, No. 137503. A Japanese man, 44 years of age, was seen on October 10, 1940. The history revealed that one month before he had noticed some soreness in the right lower quadrant and had felt a lump in this region. The symptoms, and the tumor, so far as he could determine, disappeared in a few days and he thought no more of it until the same findings, associated with diarrhoea, recurred during the past few days. His bowels moved four or five times a day but he had not noticed any blood in the stool.

On examination there was a firm, freely movable mass in the right lower quadrant, very slightly if at all tender; there was no muscle spasm. Rectal examination was negative. Temperature at 4 p.m. was 99 F. and at 8 p.m. 98.6 F. Red blood count 4,500,000; hemoglobin 71 per cent or 10.8 grams; white blood count 7,900, polymorphonuclears 75 per cent, small lymphocytes 20 per cent, monocytes 4

per cent, eosinophiles 1 per cent, no left shift, no abnormal cells. The blood Wassermann, Kahn, Eagle and Lauglen reactions were negative. Examination of feces showed no gross or microscopic blood and no parasites. X-ray of chest was negative. Colon x-ray showed a constant filling defect in the caecal region which we thought was quite compatible with malignancy. The patient being in good general physical condition, exploration was advised. We felt quite certain from the data we had gathered that we were dealing with a carcinoma of the caecum.

Operation, October 18, 1940: Under spinal anesthesia a right rectus incision was made. A greatly thickened appendix was found, surrounded by inflammatory reaction, with thickening of the base of the caecum. No abscess was present and no point of rupture of the appendix could be identified. The terminal ileum was normal and nothing was found suggesting a regional enteritis. The appendix was removed. The microscopic diagnosis was subacute appendicitis. The patient made an uneventful recovery and has remained well since.

CASE 3. Queen's Hospital, No. 159996. A Hawaiian woman, age 37, had developed pain in the right lower quadrant approximately two and a half or three months before. The onset was acute, with temperature 103 F. She was examined by a physician soon after onset of symptoms and he suspected (so she stated) trouble with her appendix. A practitioner of another art later thought to dispel the trouble by massage. Sometime after this she became conscious of a mass in the right lower abdomen. Aside from the first few days she had not been acutely ill and the pain had resolved itself into a feeling of discomfort in the right lower quadrant of the abdomen.

On examination there was found a fixed, firm mass somewhat to the right of McBurney's point. It was only slightly tender, and on bimanual examination did not seem connected with the pelvic organs. The temperature on several occasions was normal and preoperatively did not rise above 99.4 F. The general physical examination was negative. The red blood count was 5,300,000; hemoglobin 80 per cent or 10.7 grams; white blood count 9,400, polymorphonuclears 62, per cent, small lymphocytes 25 per cent, monocytes 9 per cent, eosinophiles 4 per cent. Urine examination negative. Intravenous pyelograms showed nothing abnormal except that the right psoas muscle was less clearly outlined than the left, and there was considerable ptosis of the right kidney. X-ray of the colon showed no filling defect of the caecum, and under fluoroscopic examination the mass seemed to be just below and to the outside of the caecum. Again the question arose as to the nature of the lesion, and again we were suspicious of malignancy but were more inclined to consider appendiceal involvement or some other inflammatory reaction because of the two previous experiences just described.

Operation, October 6, 1942. Under cyclopropane anesthesia (spinal anesthesia was contraindicated because the systolic blood pressure was only 92 mm. Hg) an incision outside the right rectus muscle was made. The appendix was found curled back along the under surface of the caecum, its tip lying against the lateral abdominal wall and surrounded by a small abscess, about the diameter of a twenty-five cent piece, which had burrowed into the abdominal muscles. There was also a small perforation leading from the distal and mid-third of the appendix

through the wall of the caecum. The appendix was removed, the region was thoroughly dusted with 6 to 8 grams of sulfanilamide crystals and the incision closed tight. Ten days later an intra-abdominal abscess was drained through a stab wound just inside the anterior superior spine. After this an uneventful recovery took place.

The pathologic examination showed a greatly thickened appendiceal wall due to fibrous tissue and fibroblastic proliferation. Section showed a cellular exudate on the surface with many polymorphonuclear cells. The ceco-appendiceal fistula was identified.

Discussion

In the differential diagnosis of a mass occurring in the right lower quadrant one should always consider the possibility of the lesion's being inflammatory, either from a ruptured appendix or from a ruptured diverticulum. We are accustomed, because of its usual occurrence, to think of a ruptured appendix as giving rise to an acute inflammatory process characterized by acute pain, tenderness, muscle rigidity, fever and leukocytosis. That such may not be the case is shown by the three cases just cited.

Since Crohn, Ginzburg and Oppenheimer in 1932 described the clinical entity of regional enteritis, we have had a watchful eye open for this condition. If encountered, it has not been recognized clinically; and in no case at the time of operation has any pathological condition been seen which fitted into this picture. Perhaps it will become prevalent here in the future, as has been the case with thyroid disease, which was a clinical curiosity in Hawaii until comparatively recently.

As previously mentioned, acute and chronic inflammatory lesions, usually the result of diverticula, are preponderantly more commonly encountered in the region of the sigmoid colon. It is everyone's experience at times to be unable to differentiate between a malignancy of the sigmoid and an inflammatory tumor, the result of diverticulitis, until the abdomen is opened and occasionally even until the microscopic pathological report has been completed.

It is my impression from personal experience that one will find, in 1 or 2 per cent of the individuals operated upon for acute appendicitis, that the trouble is due not to the appendix but to a diverticulitis of the caecum. These diverticula, or at least the ones I have seen, usually arise at the upper margin of the caecum on its lateral aspect and may be easily overlooked if the condition is not thought of and adequate exploration made. In at least one individual whom I have observed, a tumor in the caecal region thought to be due to malignancy was found at operation to have resulted from diverticulitis.

In concluding these remarks, I wish to emphasize the fact that one always has to consider the appendix as the disturbing factor in the causation of a lump in the right lower quadrant.

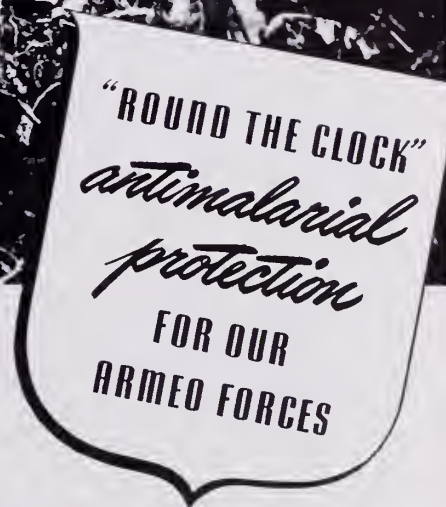
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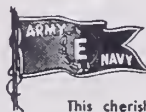


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CLINICO-PATHOLOGIC COMMENT

REVERIES OF A SENESCENT PATHOLOGIST: II

Now let us go back to the Cinderella—the Cinder Ella—of the laboratory: poor little Bacteriology.

From a review of some of the local hospitals' annual reports (St. Francis, for example)—it becomes obvious that their staffs are using wisely the departments of clinical chemistry, serology and hematology and urinalyses, much more than in the previous year, but are sadly neglecting bacteriologic investigation. The annual report of St. Francis Hospital, in press, shows the following:

Department	1941	1942
Serology & Hematology	10,921	14,151
Chemistry	345	514
Urinalysis	4,005	6,641
Bacteriology	578	594

The lack in bacteriology is obvious.

At Queen's Hospital, to be sure, the laboratory procedures dropped from 70,844 in 1941 to 51,680 in 1942, but the relative decrease is most noticeable in the field of bacteriology. General smears dropped from 845 to 735, sputum from 865 to 552, throat cultures from 165 to 94, blood cultures from 218 to 202, gonococcus cultures from 2,014 to 919 and miscellaneous cultures from 534 to 365. The fall in sputum examinations is particularly reprehensible. It seems to be the fashion to do the ten dollar x-ray first and the two dollar sputum last.

Of course, it is true that many of our diseases have a virus as an etiologic agent, and that there is not one laboratory in all Hawaii—neither private nor public health—competent or set up to investigate viruses, which fact is rather discouraging to the progressive practitioner, but no excuse for not making every effort to incriminate a bacterium, if there is any possibility at all, of being the etiologic factor.

In the early days of the clinical laboratory, Bacteriology consisted chiefly the study only of stained smears of pus, sputum, and other secretions and excretions. There was a variety of stains. Aniline gentian violet was the sheet anchor; it was nasty to make up and apt to spoil; it had an aroma that can make many an old timer nostalgic. Be-

sides, there were carmine, methylene blue, safranin, fuchsin and Gram's stain. (It is interesting to note how early in the history of Bacteriology Gram's stain helped us separate the positive goats from the negative sheep; as interesting as the very early discovery, in the history of syphilis, that mercury was useful in the treatment of that disease. And, speaking of history and the dyes used early in Bacteriology, it is interesting to remember that Robert Koch first saw the tubercle bacillus as a blue rod and not the red bacillus that has fixed itself in the mind and memory of every intern of the last twenty-five years. With the relatively recent advent of Fite's improved technique for the staining of acid fast bacilli, whereby those organisms appear as blue-black rods against a dissimilar background, those of us bacteriologically minded may shake hands across the ages with Pasteur, Koch and Gram.)

In those days there were very few culture media. Please remember that the pioneer, Pasteur, worked only with fluid cultures and that Koch, within his lifetime, almost as one man alone—did I say "alone?"—not only put this department on a scientific basis but brought it to near-perfection. He did so with the aid of his first wife, who, from her kitchen, gave him the hint of gelatin, a solidifying medium (from calves' hooves and not out of a paper carton) to hold the colonies isolated, to the production of pure cultures, the offspring of a single organism. Agar followed—as did a second wife, who could sing but not cook, for Koch.

In the early days we had beef extract broth and agar (Liebig is a name the old timers will remember), gelatin and Loeffler's medium, and very few others. Thereafter the bacteriologic physician got lost in a maze of fermentable sugars and he has not yet come out of the morass. Incubators were heated by kerosene or gas, and fluctuated violently; anyone who could cultivate a tubercle bacillus was a master; typhoid was diagnosed by symptoms, not cultures, but was confirmed by the Widal reaction; and the gonococcus and meningococcus just simply didn't grow in a test tube, any more than did—or does—then B. (now M.) leprae. The bacteriologic picture has been changed by a great many factors, but none so important as (1) pH, (2) Difco, (3) sulfa compounds, (4) knowledge of bacterial respiratory needs, and (5), at least for us, plastic molded bottle caps.

pH

The symbol pH (or p_{H}) means the logarithm of the reciprocal of the hydrogen ion concentration, and not 'degrees' of acidity or alkalinity, or the total content of alkali or acid. You are not interested in the total salt content of that pot of soup on the stove but you certainly are quite interested in how "salty" your particular plate of it is. Just so with the bugs. Just so also with your stomach. Who cares how much hydrochloric acid your dilated or contracted stomach contains; the poor little cells want to know only how concentrated that HCl is; is it pure, dilute, or very, very dilute? But many clinicians still think in terms of "degrees" of acidity.

During the last war, 1918-19, when I was making pneumococcus vaccine, it seemed such a great pity to cut up, grind up and cook up, each night, half a cow to make soup, which was titrated to neutrality with phenolphthalein as an indicator, and then to add so and so much additional sodium hydroxide to so many *degrees* of alkalinity; possibly that batch would not grow a single pneumococcus. Then, on the following night, with the other half of the same cow, with the same technique, a broth resulted that gave such abundant growth as to be quite milky. But when we found out how to adjust the reaction for hydrogen ion concentration—the only language living cells can understand—by the use of phenolsulfonphthalein (phenol red) or thymol blue, or some other dye that changes color at a given pH, the large batches of broth—hundreds and hundreds of liters that had been going down the sewer—consistently gave good growth. So today the pH method is universally used. The pH is estimated with an electric gadget (rather expensive and complicated) or a colorimetric one (quite cheap and reasonably accurate, with a wide variety of dyes with ranges from acid pH 1.2, over neutrality pH of 7, to alkaline pH 9.6).

Difco. et al.

At about that time clinical laboratories began, then, to take more interest, not only in the reactions of the media used, but in their available food content. This stimulated the manufacturers to the production of various perfected peptones, which far surpassed the previously accepted standard "Witte's", of German manufacture. Culture media consisted in those days, essentially, of meat extract, peptone, and salt, with or without the solidifying agents, agar or gelatin.

Meat extract—beef tea—is, as Martin Fischer has so succinctly said, only the urine that the cow was unable to excrete before she was slaughtered. It may

be a stimulant or a nutrient—both, or neither—to bacteria.

Peptones were the meat of the cow—those complex living cells, caught at different distances down the slope, as they cascaded from the complex protein molecule toward the simple amino acids.

Salt was salt—the electrolyte needed in all biologic activities.

A wide variety of recipes for media then made its appearance; hormone broth and agar, brain media, liver media (vitamins hadn't been invented yet, save for the anti-beriberi one, and whoever heard of a bacterium with beriberi?) until the bacteriologic literature looked like Fannie Farmer's Cook Book. Any clinical bacteriologist, trying to keep up with the times, spent most of his time steaming over a cook-stove, and he was sure to invent a medium of his own. Bacterial dietetics was the watchword of the day.

Then came the Difco people (Digestive Ferments Co., of Detroit), pioneers in their line. They made a great variety of these newer, complicated media, as well as the old, extracted the water, and marketed them in dry powder form. All one had to do was add water to dissolve, and without even bothering to set the reaction to the desired pH, autoclave the medium. Now, instead of having the laboratory shelves (or worse, the ice box) all cluttered up with fifty or so large batches of different culture media, going to waste by drying up in their test tubes, those same shelves hold bottles of dried powder that can readily and economically be made into small batches of the required medium on short notice.

More recently, other firms have come into this field, notably the Baltimore Biological Laboratory, who make the very useful Brewer's medium. This is a pork infusion broth containing a reducing reagent, sodium thyoglycollate, which permits one to grow in one liquid medium either anaerobes, microaerophiles or aerobes, or all three.

Clinical bacteriology was greatly stimulated, but the response from the clinician still left much to be desired. *Clinical* bacteriology is quite different from *determinative, analytical* bacteriology. In the latter the problem is, for example: "Here is a gram negative rod; what is it? Determine by all available cultural and other methods its exact genus and species and strain, if possible." Ideally, the problem in *clinical* bacteriology might be typified as follows: The clinician says to the clinical bacteriologist, "Here is my patient; he has such and such symptoms, which lead me to believe he has typhoid fever (or perhaps he says brucellosis or infectious endocarditis, or diph-

theria). What do you think? You were a doctor once. What do you advise and how shall we collect properly the needed specimens?" (This is pure fiction; very few clinicians ever talked to me as understandingly as that, during these past twenty-six years that I have labored in this field). Then the clinical bacteriologist has one or two or three leads that he may follow intensively. The greatest need today in clinical bacteriology is closer cooperation and consultation between clinician and bacteriologist, before, not after, the specimens are secured and the cultures made. Even if this consultation brings the laboratory an unusual request, the presence of the dried culture media gives it confidence and the assurance that it may meet all ordinary and most extraordinary emergencies; thus it welcomes the unusual problems rather than, as formerly, trying to avoid them.

The Sulfa Compounds

For a while it seemed that this ideal relationship between clinician and bacteriologist was about to be achieved, for, as each new sulfa compound made its appearance, it was supposed to be more efficacious with certain species of bacteria than with others. And so a great interest was aroused in the clinician, with reference to the specific cause of the condition he was treating, and he began to take a new interest in clinical bacteriology.

That boon went *boom* with Perrin Long's dictum that sulfadiazine would affect all the bacteria in like manner as all the other sulfa compounds, and with less toxicity to the patient. That may or may not be true, but it nearly ruined the clinician's budding interest in bacteriology. He began to prescribe sulfadiazine immediately, requesting cultures only later or when things were not going as anticipated, and thereby increased the difficulties of the clinical bacteriological laboratory; for the presence of sulfa compounds in the infected specimens presented for culture markedly inhibited or prevented the growth of organisms. This difficulty was a very considerable one until it was discovered (Janeway III contributed this aid) that para-amino benzoic acid (which is found in some of the better peptones) when added to culture media in a concentration of, say, 5 to 7 mgm. per cent, in a great measure neutralized the effect of the sulfa compounds. So today, practically all culture media on our laboratory shelf contain this acid, since most specimens for culture come from patients who have been talking sulfa compounds, either at the direction of their doctor or on their own initiative. We are under the impression that this content of para-amino benzoic acid in culture media, even though the cultured material may contain none of the sulfa compounds, enhances the nutritive value of that medium.

Bacterial Respiratory Needs

"When I was a young man before my hair was grey" we knew that there were obligate anaerobes, but culturing *B. (now Clostridium) tetani* from tissue was such a messy problem indeed that nearly every clinical laboratory gave it up as a bad job. All it got us was a negative result or a mixed culture and a lot of pyrogallic acid stain on the fingers of the laboratory personnel. And when, once in a while, the typical gram-positive drumstick bacillus was recovered in pure culture, it did not help the patient—he had died two days previous with *risus sardonius*, for there was no adequate, *generally accepted* way of treating tetanus in those days—before my hair was grey—than there is now. *Risus sardonius*!

In 1908 Nowak discovered that if the available oxygen was reduced and the carbon dioxide was increased, Bang's bacillus (now called *Brucella abortus*) grew more consistently and luxuriantly. In 1918 Wherry and Oliver showed that these gaseous conditions, then called "partial tension cultures," markedly enhanced the growth of the gonococcus. I myself, working in their laboratory, in 1916, found a streptothrix in carious teeth that was an obligate micro-aerophile; it would not grow aerobically nor anaerobically but only under partial tension conditions. It was the subject of my first medical publication, in the *Journal of Infectious Diseases*.

Other germs were added to the list that grew best—particularly in primary cultures—under partial tension (now called "capneic" or "mephitibic") conditions. These considerations were sadly neglected or forgotten until the national ballyhoo against venereal disease became strident; today the laboratory that does not feed its gonococcus the proper food and give it the proper air to breathe is apt to be arrested for cruelty to animals or malpractice. Many ingenious methods of creating these atmospheric conditions have been evolved; any are satisfactory if they produce the desired gaseous environment. Some are more laborious than others. But the gaseous environment is quite as important as the food—the culture medium—on which the bacterium is artificially grown.

Molded Bottle Caps

I should like to conclude my reveries by saying a kind word for molded bottle caps. They crept into the medical world at about the same time as the vitamins; they have been far less advertised and far more useful. The cork tree, under which rested Ferdinand the Bull, can now be sacrificed without compunction, and Ferdinand may have to return to the bull ring.

The molded bottle cap stands autoclaving and does not shrink during the weeks, months or years. One-ounce bottles have replaced, in our laboratory, cotton-stoppered test tubes; and two-ounce bottles, with molded stoppers, have replaced petri dishes. The moisture is conserved indefinitely.

If the molded, screw-on bottle cap has a hole and a rubber inner liner, replacing the waxed paper one, the air may be exhausted with a hypodermic needle and replaced with any desired gaseous mixture. If that mixture be lowered oxygen and increased carbon dioxide, the modern term is 'capneic'; and I like the term, for the condition is most simply and easily obtained with the aid of these bottle caps.

The inventor of these bottle caps, that have so altered the work of many fields, including bacteriology, is unknown; but he certainly deserves a medal of some sort with so many being distributed for destruction, not construction, these days.

The clinical laboratory has slowly made progress—very slowly—in bacteriology, but I fear that the clinician has not kept step nor demanded his rights; I fear he knows less bacteriology today than on the day he received his sheepskin. And that being so I fear will condemn Cinderella to be forever a Cinder Ella, sifting ashes, and never give her a chance to wear the glass slippers nor the resplendent clothes.

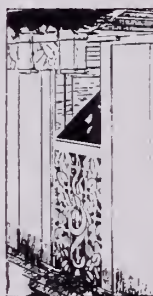
E. A. FENNEL, M.D.

HAWAII SOCIETY OF CLINICAL PATHOLOGISTS

The Hawaii Society of Clinical Pathologists held a tumor seminar on April 17, 1943, from 7 to 9 PM at Tripler General Hospital (Farrington High school). Sections from 8 cases previously mailed to the men attending were projected on a screen and the slides discussed. Following the meeting refreshments were served by the Army. The following doctors were present: Doctors A. Majoska, Louis

Hirsch, Jesse Smith, Harry Arnold, Jr., I. L. Tilden, Cmdr. E. M. Butt, Lt. Cmdr. C. R. Jensen, Lt. I. Chapman, Lt. Bernet, Lt. Col. C. E. Moran, Capt. D. L. Adler, Capt. Levison, Capt. W. A. Hause, Capt. Weiss, Lt. H. Lawrence, Capt. Rosenthal, Major R. C. Wadsworth and Major C. F. Tessmer.

T. L. TILDEN, M. D.
Secretary



Shadowing the surgical patient



... be-dogging his footsteps to the hospital . . . pursuing him to surgery . . . ever multiplying on his skin *are the pathogenic bacteria!* Harmless preoperatively, the agents of infection can become dangerous if surgical intervention follows inadequate aseptic and antiseptic measures. ● Efficient preoperative skin disinfection is especially important. How well Tincture Metaphen 1:200 is suited for this exacting task has been emphasized by the results of an impartial, comparative study* of fifteen commonly used antiseptics. ● On the oral mucosa, Tincture Metaphen was found to reduce bacterial count 95 to 100% within five minutes; to cause only a slight irritation to some of the subjects, none to the others; and to have, in substantial excess of any other antiseptic tested, a duration of action of approximately two hours. ● Prescription and hospital pharmacies can supply your office and surgery requirements for Tincture Metaphen promptly. Abbott Laboratories, North Chicago, Ill.

*Meyer, E., and Arnold, L. (1938), *Amer. J. Digest. Dis.*, 5:418

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High upon a gleaming pedestal stands the trained nurse, winning the gratitude and warm appreciation of every community today . . . In Hawaii, where our exposed position has developed such a heavy excess population, with its intensified public health problems, the trained nurse is enshrined in the hearts of all people . . . Serene and competent, this valiant woman stands, side by side with the physician, fighting against all of the ills that the flesh is heir to . . . Untiring, her inspiration broods over the scene of our embattled islands. Here her example, to the Armed Forces of the war front and to the civilian life of the home front, will stand forever before the mind's eye. The emotional strain that suffering humanity inflicts upon the nurse, in her daily round of duty, would break a lesser spirit . . . The shattered nerves and broken bodies, restored by her ministrations and compassion, are a tribute to her patience and skill . . . Our thanks and lasting gratitude are hers . . . God bless our nurses!



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EMERGENCY MEDICAL SERVICES

(FORMERLY MEDICAL PREPAREDNESS)

Report made at the Annual Meeting of the Honolulu County Medical Society

Since the details of the operation of the Medical Section of the Office of Civilian Defense have been reported in each issue of the JOURNAL, it is not thought worth-while to repeat this information here. The minutes of the meetings of the Preparedness Committee, which have been very few in the past year, are on file in the office of the Society and may be consulted by anyone who is interested. It is, however, probably worthwhile to enumerate some of the completed medical projects to give you an over-all idea of our activities.

On this island, Sacred Hearts Hospital has been in operation for a year this month, has treated approximately 2,000 patients in that time and has done nearly 200 major surgical operations, but, of course, has treated no war casualties and it is hoped that it never will. About 50% of the patients are employed on defense contracts and are hospitalized for illness and industrial accidents. The balance has been largely the overflow from overcrowded hospitals in the city.

Wahiawa Hospital has also been in operation approximately one year, but with a very much smaller volume of business and, unlike Sacred Hearts Hospital, has been used very little by private physicians. Most of the work at Wahiawa has been the care of the dependents of officers and soldiers living near Schofield Barracks. Elementary essential medical equipment for a small hospital, including surgical and obstetrical materials, has been provided in three rural areas for the care of evacuees who might not be able to travel as far as Wahiawa. They are respectively at Kunia and Kipapa Schools and at Waimano Home. The instruments, drapes and dressings are sterilized and hermetically sealed in large tins with the list of the contents on the cover. A 100 bed addition for the treatment of ambulatory tuberculosis has been added to the Wahiawa Hospital and will commence operation as soon as the balance of the equipment arrives.

Manoa and Shriners' Annex Hospitals have never had any patients*, but are ready for them if the time comes.

In addition to the blackout, ventilation and

ramp-escape construction provided for Honolulu hospitals and other hospitals of the Territory, there are several hospital projects which should be mentioned. Two 25-bed wards have been added to Kuaikini Hospital to care for the possible occurrence of an epidemic of contagious disease requiring isolation of patients. The construction of a 30-bed isolation unit at Queen's has been approved and construction will start in a few days. This will permit the remodeling of the present contagious wing into a kitchen. A 30-bed evacuation ward has also been authorized for Queen's Hospital to permit the removal of the patients from Liholiho I to this building should it be necessary to move the surgery to Liholiho I. A proposal to construct nurses' classrooms for Queen's Hospital to facilitate the training of nurses has been approved by everyone concerned in Hawaii, and rests with the Interior Department in Washington. Also the plan to construct a 30-bed obstetrical unit adjacent to St. Francis Hospital has been held up by the Interior Department, but it has been urgently recommended by everyone concerned here.

On Hawaii no new hospitals have been built and the work of the Medical Department has been merely to furnish supplies and equipment for the expanded capacity of the existing hospitals. On Maui one hospital has been built at Waikapu and has been turned over to the Army for operation with an agreement that the Army care for civilians if necessary. The other hospitals remain in operation at their evacuation sites mauka. St. Anthony's at Wailuku has been set up by the O.C.D. with a capacity of 30 to 50 beds to care for emergencies. On Kauai the new hospital at Waimea is ready for occupancy as is the one at Huleia. On Molokai, Puu Kolea is ready for occupancy and the High School hospital on Lanai is ready also.

The nursing shortage remains the outstanding serious unsolved problem of this department. The serious shortage of nurses on the mainland, coupled with transportation difficulties, still prevents our importing an adequate number of nurses to fill our vacancies. The last survey shows that approximately 111 nursing vacancies exist in the Territory. In my opinion they will never be filled and the answer to the problem can lie only in conservation of nurses' services by doctors and others and by the training of non-professional personnel to carry out many nursing functions.

*Since this report Shriners' Annex has become the Emergency Poliomyelitis Hospital.—Ed.

Since the war began 9 doctors have retired from practice, 8 have left the Territory, 2 have died, 22 have joined the Army, 11 have joined the Navy and 6 have been detained. This makes a deficit of 58 medical men and there are left in practice on Oahu 206. There are 41 doctors on Hawaii, 20 on Maui, 16 on Kauai, 3 on Molokai and 1 on Lanai. This figure is exclusive of internes in hospitals, but does include physicians in institutions like Kalaupapa and the tuberculosis hospitals. The Army has adhered to its original decision not to activate the commissions of medical reserve officers any further unless the need is overwhelming. I know of no navy reserve medical commissions which have not been activated.

The definite lessening of the war tension locally is leading to a considerable degree of complacency, the justification for which is beyond my power to estimate. A proposal has been made that the hospitals on Maui return to their original sites and the recommendation has also been made that certain aid stations which are now operating on a part-time basis only should be completely closed and merely cared for and maintained ready for use. In my judgment these proposals will probably increase in number as times goes on unless we experience military reverses.

The recent return of many functions of government to civil authorities has presented many serious medical problems in that no substitutes are available for the Army personnel which carried on many of these functions. At the time of this report I am assured by the Department Surgeon that, until further action is taken, these doctors and nurses will not be disturbed in their present duties. This is, of course, not a promise for the future, but good for the time being. Owing to the extremely able assistance of Major Chung-Hoon, who has been in this office since July, 1942, your chairman was able on the first of the year to assume a half-time volunteer status and devote a portion of his time to practice. It is impossible to overstate Major Chung-Hoon's value to this office. His intimate knowledge of the Territory as a whole and of the doctors and hospitals in it has made him more useful than any malihini could have been. We medical men are deeply indebted to the Army for his services. Dr. Dickson who has been in charge of the aid stations and ambulance service has likewise gone on a part-time basis and Major Chung-Hoon is carrying some of his responsibilities also.

H. L. ARNOLD, M.D.,
Territorial Medical Director, O.C.D.



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Do You Know . . .

- That in 1942 the Association has paid to Honolulu County Medical Society members \$29,170.05
- The Physicians' Reserve Fund of \$3,683.96 will be returned to the doctors by October 1st, 1943
- The 10 per cent Physicians' Reserve Fund Deduction will continue thru 1943
- Over 6000 Honolulu residents are protected thru H. M. S. A.
- The Association now has 155 Honolulu business firms enrolled in the plan, plus many schools, social agencies and city-county employees
- The H. M. S. A. Plan is sound in policy and finances, is "second to none" on the mainland

COUNTY SOCIETY REPORTS

HAWAII COUNTY MEDICAL SOCIETY

The 213th regular meeting of the Hawaii County Medical Society was called to order on February 23, 1943. Fifteen members were present. Captain Flinter of the local Board of Health was guest.

The President read a letter from Mr. Tate Robinson, Director of Health Education of the Department of Public Instruction, requesting the cooperation of the Society in a tuberculosis survey of the teachers and employees of the various schools on the island. Dr. Leslie explained the *modus operandi* of the proposed survey; he stated that the survey was sponsored by the Department of Public Instruction and was to be financed by the local Tuberculosis Society. He believed that x-rays were to be taken by Puumale Home and various outlying county and plantation hospitals where these facilities exist, these institutions to be remunerated at a rate of \$1.25 per film but at no cost to the school employee. After some discussion, the Society went on record as approving the project.

Dr. Leslie brought up for discussion a survey of direct food-handlers on the island. Dr. Patterson suggested that discussion be deferred until a more definite program had been set.

The Treasurer, Dr. Loo, reported that there was about \$800.00 in the Treasury. He stated that two members, Drs. O. K. Tofukuji and H. W. Kurashige, were more than one year in arrears in dues. It was the consensus of opinion that since the constitution and by-laws provided that such delinquent members be dropped from the roll of members and that since these members had been notified to this effect, no action was indicated at this time except to conform with the by-laws.

Dr. Keay, chairman of the Legislative Committee, reported that the committee had come to no definite conclusion in respect to premarital certification of freedom from venereal disease. Dr. S. R. Brown, Councillor of the Territorial Association, reported that at the last meeting of the Council the Territorial Legislative Committee had made no definite recommendations although it was generally agreed that: (1) legislation requiring prenatal examination and serological tests would be passed; (2) legislation requiring premarital examination was doomed to failure because of opposition of powerful organizations. Captain Flinter reported that the Territorial Council of Social Agencies was recommending premarital examination.

Dr. Patterson stated that the H.S.P.A. had recently appropriated \$2500.00 to conduct a survey of Weil's Disease; he believed that the survey would be directed by Dr. Alicata of the Univ. of Hawaii with the cooperation of the Board of Health. Captain Flinter stated that the local Board of Health had recently requisitioned material for agglutination tests for that disease.

Dr. Mizuire read the report of the recently appointed Library Committee composed of Dr. Crawford, chairman, Dr. Mizuire and Dr. Leslie. The Committee reported that: (1) the sources of material lay chiefly in the volumes of books and journals now owned by the Hilo Memorial Hospital and in subscription to other journals of general interest. These could be supplemented by loans or donations from Puumale Home, private physicians and the Territorial Association. It was reported that the latter has duplicate volumes of quite a number of journals which would be released to the Society if the latter so desired. The Committee felt that journals were preferable to books for the maintenance of a current library. (2) The housing of the material would be most conveniently cared for in the staff room of the Hilo Memorial Hospital. Book-cases had already been made available and the recorder's office of the hospitals would serve as librarian. The Committee recommended that for binding the past journals and the establishment of a library, an initial expenditure of \$300.00 would be required. Considerable discussion followed. Dr. Keay moved that the Society appropriate \$300.00 for the establishment of a library. Carried. Dr. Orenstein suggested that an agreement be made between the hospital and Society whereby the bound volumes were to become the property of the Society rather than of the hospital.

Dr. Patterson stated that he had written a personal letter to Mrs. G. Giacometti, Supervising Principal of Central Hawaii Schools, suggesting that, in view of a recent increase in incidence of trichinosis on the island, an educational program stressing thorough cooking of pork and garbage should be instituted, possibly initiating in the schools on the island. The Society officially approved this move.

The Committee on By-Laws reported that a copy of the Constitution adopted in 1925 with amendments to date and one of the proposed Constitution had been mailed to each member of the Society. Dr. M. L. Chang, chairman, stated that there were some deficiencies which had been overlooked, that

the changes were too numerous to discuss. The phrase "convicted of felony" was objected to. After some discussion, Dr. Phillips moved that the Committee be requested to consult an attorney regarding the legal aspects of the clause and in respect to the advantages and disadvantages of incorporation. Dr. Orenstein added to the motion that the Committee be provided with funds. Seconded by Dr. Sexton. Carried. Dr. Orenstein moved, Dr. Sexton seconded, that the Committee study membership more thoroughly, in regard to admission of military members, health officers and honorary members. Passed.

The discussion on the resolution adopted by the House of Delegates of the A.M.A. regarding the repression of prostitution was continued. After considerable discussion into which Captain Flinter entered, it was moved by Dr. Phillips that the resolution be tabled and that the Territorial Public Health Commissioner be notified to that effect. Seconded by Dr. Wippermann. Passed.

The 214th regular meeting of the Hawaii County Medical Society was called to order on March 20, 1943, at the Elk's Room. The meeting was the president's annual dinner meeting. Twenty members and 16 guests were present. Among the guests were Col. George Baehr, Chief of the Emergency Medical Service of the Office of Civilian Defense of the United States, Dr. H. L. Arnold, Chief of the comparable service in the Territory and Col. S. A. White, Commanding Officer at the Mt. View Hospital.

Dr. Arnold spoke on various aspects of the medical defense program. (1) He was desirous of getting the Society's opinion regarding the advisability of having the OCD store a reserve of liquor for medicinal purposes to be issued on prescription of a physician. (2) He stated that it was deemed necessary to close blood banks operating under the OCD but that a technician would be available for blood-grouping projects and to operate a bank for peace-time needs. (3) He commented on the excellent cooperation between civilian and military authorities on the utilization of facilities and personnel.

Col. Baehr stated that excellent cooperation also existed between the military and civilian authorities on the mainland. He reported that arrangements have been completed with hospitals in the interior whereby the latter would house and give medical care to evacuees of hospitals in coastal cities in the event of casualties in these areas. He then spoke lengthily of the War Civilian Security program which had recently been set up but would be retroactive to December 7, 1941. Such program provided protection for both volunteer and paid personnel in all the branches of the O.C.D. whether in

line of duty or during an attack; this protection, he stated, included among other things: (1) hospitalization, (2) medical care, (3) benefits for permanent disability, (4) partial wages during disabled period.

Col. White corroborated the first two speakers on the cooperation between civilian and military medical personnel.

A fairly lengthy discussion then followed on the storage of a reserve of liquor for medicinal purposes. It was moved by Dr. Carter, seconded by Dr. Mizuire, that the Society go on record favoring the storage of a reserve of liquor by the O.C.D. for medicinal purposes to be issued by the prescription of a physician. Passed.

It was the consensus of opinion that the blood bank should be closed except for operation at a minimal pace to supply civilian peace-time needs.

The matter of the incarceration of insane persons in jail was referred without discussion to the Legislative Committee.

The Treasurer's report of a balance of \$1,084.94 was read, accepted and ordered placed on file. The Treasurer reported that Kurashige had paid his delinquent dues. It was generally agreed that any action in regard to reinstatement without re-application would conflict with the by-laws.

The annual election took place.

The 215th regular meeting of the Hawaii County Medical Society was called to order on March 31, 1943. Those present were: Drs. C. D. Brown, S. R. Brown, Hata, Keay, Leslie, Orenstein, Patterson, Phillips, Sexton, Tomoguchi, Wippermann, Yoshina, Yuen and M. L. Chang.

The President brought up for discussion Senate Bill No. 92, an act to amend Act 122 of the present laws. In essence, the bill proposed to lower the qualifications for the position of Territorial Commissioner of Public Health so that any licensed doctor of medicine, without training or experience in public health work, would be eligible. The president stated that he had received reports that the Territorial Board of Health and the Territorial Medical Association had voiced disapproval of the proposed amendment.

After considerable discussion, it was moved by Dr. Keay, seconded by Dr. Phillips that the Society be unalterably opposed to the lowering of qualifications for the position of Territorial Commissioner of Public Health, as proposed by Senate Bill No. 92. Unanimously passed. Dr. Orenstein moved that the secretary send special delivery air-mail letters to that effect to Gov. Stainback, Lt. General Emmons, Dr. M. F. Haralson, Secretary of the Territorial Medical

Association, secretaries of the three other county medical societies, and to each and every member of the legislature. Seconded by Dr. Patterson and passed unanimously.

In respect to legislation on the whole, it was brought out by several members that the Territorial Medical Association and its representatives, the legislative Committee, have repeatedly in years past failed to notify this Society of legislative measures introduced at the legislature, have failed to notify this Society of its attitude and action in regard to legislative measures which concerned the welfare of this society and medicine in general. There was general emphatic agreement on this point. Dr. Orenstein moved, Dr. Phillips seconded, that the Delegates of this Society be instructed at the next annual meeting of the Territorial Medical Association to inform that body that its Legislative Committee shall henceforth inform its component societies of any pending legislation. Carried unanimously.

Dr. Orenstein brought up for discussion the new ruling of the local Board of Health providing that all laboratory specimens be sent to the out-of-town laboratory rather than to the centrally located main office. It was felt that this was creating unnecessary inconvenience. Dr. Orenstein moved that the Secretary be instructed to write to Capt. Flinter requesting that the former method of sending specimens to the main office be reinstated. Seconded by Dr. Yuen. Carried.

The 216th regular meeting was called to order at 4:15 p.m. on April 20, 1943, at the staff room of the Hilo Memorial Hospital by the President, Dr. L. L. Sexton. Seventeen members and three guests were present.

The minutes of the last meeting were read and approved.

Dr. I. Larsen presented two interesting case reports of "Blood Dyscrasias Occurring During Anti-leptic Therapy." Discussion by Major Wadsworth and Major Spitz. The importance of routine blood studies in these cases was stressed by all speakers.

Letter was read announcing the annual meeting of the Territorial Medical Association on May 21, without scientific session, and delegates Crawford and Patterson stated their intention to attend.

Dr. Patterson stated that several of the Mountain View Hospital medical personnel desired to become service members of the society. This was referred to the By-Laws Committee.

The Library Committee reported that forms had been mailed out to individual members requesting

information on medical journals. Dr. Crawford, chairman, reported that binding of the journals was progressing satisfactorily.

Dr. Orenstein, chief of the Emergency Medical Service, reported that he had received a favorable reply from Dr. Arnold to his suggestion that a nurse be sent to Honolulu to be trained in the Kenny treatment of poliomyelitis, in view of the recent increase in this disease. After considerable discussion it was voted that the O.C.D. send a nurse to Honolulu and that the selection be left in the hands of a committee composed of Dr. Orenstein, the President and the Secretary.

Letter from Dr. Enright was read in reply to the Society's request that the Board of Health furnish pertussis vaccine to private physicians for use on indigent patients. This stated that "there is no objection to government physicians to use part of their allotment for the purchase of pertussis vaccine" and that "we do not recommend the general introduction of pertussis immunization by the Board of Health."

Dr. Orenstein brought out the fact that while funds were available for obstetrical care in families of military personnel, no such funds were available on this island. Dr. Orenstein was appointed to investigate this matter.

Meeting adjourned at 6:15 p.m.

M. LEON CHANG, M. D.
Secretary

MAUI COUNTY MEDICAL SOCIETY

The regular meeting of the Maui County Medical Society was held at the Wailuku Hotel on April 11, 1943. (Luncheon Meeting).

Dr. K. Izumi presided; present were Drs. Dunn, Osmer, Shimokawa, H. Izumi, Balfour, McArthur, von Asch, Kanda and Patterson; guests: Colonel Bryant, Major Shupe, Major Wilbar, Captain Lamberson and Captain Boyer.

The minutes of the February 7 meeting were read and approved.

The minutes of the Councilors' meeting held February 18 were read and discussed.

Dr. McArthur reported that the Index Medicus for the past two years and other journals received from the Honolulu Library had been placed in the Maui County Free Library and were available for general use.

The act passed by the Legislature concerning the reorganization of the Board of Health was dis-

cussed. It was voted that the society go on record as opposed to lowering the qualifications of the Territorial Commissioner of Public Health and the secretary was instructed to notify the Legislative Committee of the Territorial Association of this action.

Letter was read from the Board of Health regarding medical inspection and certification of prostitutes. As there are no prostitutes on Maui operating as such, no action was taken.

Dr. Dunn proposed that in recognition of more than 30 years of service, the society make Dr. F. A. St. Sure, Sr. an honorary member. Carried unanimously. Dr. St. Sure began practice in the territory in 1904 and has now retired from active practice.

Since the start of the war the activities of the society have been limited to the society's business and to helping the medical organization of civilian defense. At our last meeting it was decided to call upon some of the excellent talent among the Army Specialists as guest speakers. Dr. McArthur was asked to arrange a program. Colonel Bryant and his staff of the 22nd Station Hospital prepared an excellent program including a lecture by Colonel Bryant and four clinical cases, as follows: laceration wounds; perforating wound with wounds of entrance and exit, and penetrating or lodging wounds in which the bullet remains buried in the tissue, were discussed; their first aid treatment, hospital care and surgery.

W. B. PATTERSON, M.D.
Secretary

HONOLULU COUNTY MEDICAL SOCIETY

A summary of activities of the Board of Governors and membership meetings from January 8 through May 7, excluding the annual meeting, which is reported separately.

Response from the membership to the U. S. Life Insurance Company group insurance plan for doctors was 35 (16%) not interested; 100 (60%) no reply; 65 (32%) interested. The list of interested doctors was turned over to the insurance agent to work up the 75 per cent participation required by the insurance company.

The problem of providing care for elderly people whom the hospitals cannot accommodate was discussed. Dr. Lee reported that this matter had been under discussion by the Board of Health and other agencies and was tabled until after the war. Dr. Benyas was appointed chairman of a committee to study this problem, and the committee subse-

quently circulated a questionnaire to the membership, the results of which are being studied.

The Board of Health proposed that the medical society adopt a resolution in regard to prostitution, stating: "Since the records of this office indicate that the professional prostitute is the source of about 75 per cent of venereal disease infections occurring in the Territory, which constitutes a serious problem for the armed forces and the civilian population, any method whereby the incidence of venereal diseases may be lessened obviously will be a contribution to the war effort . . . It is believed that the adoption of a resolution similar to the one which is included by the several local medical societies would be of assistance to the Board of Health in controlling venereal diseases in the Territory:

WHEREAS, published reports indicate an increasing prevalence of venereal disease in the armed forces and defense workers of this nation;

WHEREAS, commercialized prostitution constitutes an outstanding factor in the dissemination of these diseases and requires an intensified campaign against their elimination; therefore be it

RESOLVED, That the House of Delegates of the American Medical Association takes the following stand: (1) that the control of venereal disease requires elimination of commercialized prostitution; (2) that medical inspection of prostitutes is untrustworthy and inefficient, gives a false sense of security and fails to prevent the spread of infection, and (3) that prostitution is unlawful, and physicians who knowingly examine prostitutes for the purpose of providing them with medical certificates to be used in soliciting are participating in an illegal activity and are violating the principles of accepted professional ethics.

The Board of Governors felt that until the military authorities present a clear-cut attitude on the question of prostitution, it was no the business of the medical society to take any action.

Dr. Walker reported for the Library Committee that although there is a theoretical balance available to the committee, actually the County Society would go into the red if that balance were spent. The \$1,500 yearly appropriation for library purposes is considered insufficient and the committee asks that for next year this be increased. To meet this, it was suggested that the dues be increased. The suggestion that the Committee try to raise funds in the community was not favored. A motion to increase the dues \$10. was tabled and it was felt that such a recommendation be considered after the Society's books are closed for the Year and a budget for the Library drawn up.

On receipt of a communication from Dr. Arnold Sr. of the OCD regarding the effects upon hospitals, medical and nursing professions of the restoration of civil functions, a special committee of the Society called upon the Governor.

Dr. Arnold Sr. proposed to make available a certain quantity of liquor against prescription by physicians. In view of previous unpleasantnesses in

the prescription of liquor, it was decided to advise Dr. Arnold that the physicians did not wish permission to prescribe liquor but proposed that machinery be set up so that small quantities will be available for individual patients upon the personal request of physicians.

Letter received from General Emmons, dated February 7, 1943, commending the Society for its work on the December 7 was ordered photographed and framed.

At the May 7 meeting Dr. Arnold Sr. presented an agenda for discussion which was acted upon as follows:

"Malpractice insurance for Army medical officers on duty in civilian hospitals. The Board agreed that these officers be recognized to obtain malpractice insurance on the same basis as civilian physicians, upon becoming members of the Society. The service membership of \$5.00 per year would make them qualify.

"The Board was of the opinion that surgical practice in O.C.D. hospitals should be limited to those men authorized by the American Hospital Association.

"The Board felt that the Poliomyelitis Hospital should be operated by a closed staff for the present, and that this staff should receive remuneration for the care of indigent patients.

"The matter of discontinuing the use of private duty nurses except upon decision of the hospital nursing staff and a board of physicians was tabled for further study.

"The Board was in accord with the suggestion that physicians use the less bulky drugs wherever possible.

"The Board will petition the Governor to persuade the War Department to permit the retention of Army doctors now serving as residents at St. Francis, Leahi and Kapiolani Hospitals."

Senate Bill No. 159, relating to the Department of Public Welfare, extending benefits to the furnishing of medical care, hospitalization, etc., was discussed, and it was decided to ask the Governor to allow representation of the medical society in advisory capacity in the drawing up of procedures for the execution of this bill. Drs. Mossman, Winter and Smith were appointed a committee to attend to this.

The Society received a Resolution from the Senate proclaiming and recording the outstanding service by the Honolulu County Medical Society and the physicians and surgeons volunteering for service on December 7th, 1941 in the care of the wounded of the armed forces.

On April 22, 1943, the members of the society were guests of Captain McMullin and his medical officers at the U. S. Naval Hospital, Aiea Heights. A tour of the hospital was made at 3:00 p.m. and a buffet supper served. Papers were presented as follows:

- Cysts and Fistulae of the Neck
LT. COMDR. FRANK H. WANAMAKER
- Wood Alcohol Poisoning
LT. COMDR. WALTER L. VOEGTLIN
- Experimental Immersion Blast Injuries
LT. MORRIS T. FRIEDEL
- The Role of Intramuscular Pressure in Shock
LT. COMDR. LEWIS GUNTHER

ANNUAL MEETING

The annual meeting of the Honolulu County Medical Society was held on Friday, April 2, 1943, at 8:00 p.m. in the Mabel Smyth Auditorium following a buffet supper given by the outgoing President, Dr. Fred K. Lam. Sixty-three members were present. Reports of officers and committees were heard.

The following were elected to office:

- | | |
|---|--|
| <i>President:</i> | N. M. BENYAS |
| <i>Vice-President:</i> | H. H. WALKER |
| <i>Corres. Secretary:</i> | F. J. HALFORD |
| <i>Recording Secretary:</i> | R. L. HILL |
| <i>Treasurer:</i> | H. E. BOWLES |
| <i>Board of Governors:</i> | R. O. BROWN
RICHARD LEE
WILLIAM WINTER |
| <i>Alternates
Board of Governors:</i> | JESSE SMITH
HARRY L. ARNOLD, JR.
H. M. JOHNSON |
| <i>Board of Censors:</i> | V. E. M. OSORIO |
| <i>Committee on Forms
Medical Practice:</i> | FRED K. LAM |
| <i>Delegates to Hawaii
Terr. Med. Ass'n.:</i> | A. G. SCHNACK
ARTHUR DAVIS
MAURICE GORDON
EDMUND ING
FRANK SPENCER |
| <i>Alternates for
Delegates:</i> | H. S. DICKSON
P. S. IRWIN
WILLIAM WYNN
D. C. MARSHALL
JAMES KUNINOBU
H. Q. PANG |
| <i>Hawaii Med. Service
Association:</i> | F. J. PINKERTON
L. G. PHILLIPS
RICHARD SIA |

The Secretary reported a total of all classes of membership as 249. Of these, 16 are honorary members, 14 service members and 19 are members in full-time military service.

Workmen's Compensation Committee (Dr. Pinkerton, Chairman) reported eight meetings throughout the year, several of them with insurance representatives to promote a wider choice of physicians in the expanding industrial case loads, and to discuss alterations, amendments and amplification of the Workmen's Compensation Fee Schedule. The insurance men were willing to entertain the society's proposals for change, and the committee has done considerable work on this revision since. Physicians in the specialties were invited to submit suggestions for revision; these have been assembled and coordinated and are awaiting final review by the committee. In general the changes being considered constitute: (1) amplification and a more comprehensive itemization to include listings not now included; definitions and listings of new procedures that have come by practice to be considered industrial accident items; (2) A definite increase in certain items due to increased medical salaries, care, rent, drugs and general expenses; and (3) a definite reduction for certain fees which in the past have been too high.

A sub-committee heard several controversial cases between doctors and insurance companies and rendered reports promptly with apparent satisfaction to all parties concerned.

In June, meetings were held with Hawaiian Constructors-U.S. Engineers in an effort to arrange an agreeable medical care fee schedule for their contract employees. It seemed our efforts to bring these employees under the H.M.S.A. plan were about to materialize, but a change of authority took place and these employees were put under military medical care.

Resolutions Committee (Dr. Batten, Chairman) reported two resolutions adopted recording the death of Dr. Charles R. McLean and Dr. Harry T. Hollman.

Committee on Forms of Medical Practice (Dr. Doolittle, Chairman) reported one meeting during the year to consider the current local practice of examination and treatment of firemen. No complaints of irregular contract practice were brought to the committee. Members of the committee participated actively in the consideration for revision of the Workmen's Compensation Fee Schedule and in efforts to benefit the health of war workers in Hawaii. The committee closed its report with a note of caution: "It is suggested that all members

of the local Society interest themselves in the programs of so-called socialized medicine. Great Britain is laying plans for spread of government controlled sickness insurance which may have far-reaching effects in that country and in ours. Labor organizations in our own country and many high-ranking government officials are planning spread of a similar program in our country. We should be 'in the know' and probably our best protection against objectionable programs is to lend a sympathetic ear and to attempt to guide such effort in its inception and growth. The Medical Service Association is a partial answer to this problem. Work of that Association should be better understood by all members of the society. Your full cooperation in the organization's program is urged."

The Reception Committee (Dr. Dougan, Chairman) reported as follows:

"No formal meeting of the Reception Committee was held during the year owing to the exigencies of war. Individual members have, with the hearty assistance of the other members, endeavored to work and otherwise see that visiting physicians, particularly those in the service became acquainted with local doctors in the same specialties or with common interests.

"The practice of introducing new physicians at the medical meetings has received favorable comment.

"The committee feels however that much more may be done by way of increasing attendance and membership as the restrictions imposed by the necessities of war are removed."

The Medical Milk Commission (Dr. Winter, Chairman) reported as follows:

"During the year there were nine regular meetings and three special meetings.

"Early in the year it was realized that because of an ever-increasing labor shortage as a result of the war, the production of Certified milk, in Honolulu, and for that matter all fresh milk, might come to an end. This possibility was brought to the attention of the Military Governor, and representation from the Milk Commission, as well as those from other sources, were instrumental at least in part in bringing about a "freeze" of labor in the dairy industry. Labor was frozen in a general way to the industry and not in a specific manner to the individual dairies themselves, with the result that a man might leave any dairy at will, but he could not leave the milk-producing industry at large and seek occupation in some other field. This has probably helped to maintain the supply of fresh milk in the city—which supply is already many times smaller than the evergrowing demand.

"Salaries for the entire paid staff were raised substantially during the year and one new paid worker was added to the staff. The general cost of operating the Commission's laboratory rose appreciably. In the face of this it was necessary to increase the basic monthly assessment to the certified dairies fifty percent on the first hundred cows.

"The maintenance of standards was difficult throughout the year and the Commission has been somewhat liberal with the dairies in this respect, bearing in mind always the difficulties under which they are now operating. During the year a sincere effort was made by all concerned to maintain the standard of certified milk, but this high aim under present conditions is not always possible.

"Because of this the Milk Commission has been generous but in this respect it can not afford to be generous to a fault. After due consideration and general discussion it is the unanimous opinion of the Commission that for the duration of the war *all* milk produced within the City and County of Honolulu should be pasteurized.

"If, as a general precautionary safeguard, it was thought wise to protect the city's water supply by chlorinating it, is it not equally logical to protect the milk supply of the city by pasteurizing it? The Commission believes that it is, and makes this recommendation to the Honolulu County Medical Society, leaving to the parent body whatever action it may deem advisable."

The Preparedness Committee's report (Dr. Arnold, Chairman) is omitted here and appears instead in the Emergency Medical Service section of this issue since it is of such general interest also to the members on the outside islands.

The War Workers Committee, a special committee appointed late in the year, headed by Dr. Withington, to deal with the problems which have arisen concerning the health and medical services for defense workers, had one very satisfactory meeting with representatives of the Army and Navy, and it is expected that this work will be carried on.

The Library Committee (Dr. Walker, Chairman) reported:

During the year four meetings of the Library Committee were held at which times

routine operational matters were reviewed, minor changes in policy adopted, new book and journal acquisition studied and authorized, and discussions held relative to future plans for the growth of the Library.

A great many hours of work have been devoted by Mrs. Bolles and her assistant to the multitude of details necessary to promote the organization, operation and growth of our library. The expert services of Mrs. William Shanahan in a consulting capacity have been of inestimable value in establishing and developing the present system of index and classification, and otherwise in advising on technical matters. The Society is deeply indebted to these individuals for their unflagging efforts in building the library to what it is today.

Our outstanding acquisition of the year was the major portion of the library of the Kalihi Receiving Station which, thanks to the kind offices of Dr. Linson, was obtained on an extended loan basis. This collection, consisting largely of bound volumes of numerous journals extending back over many years, greatly enhances the value of our reference library.

Operating expenditures for the year will total approximately \$1,850, of which \$350 is allotted for new book purchases authorized but not as yet acquired.

Attached is the budget for the ensuing year, as approved by the Committee and recommended for adoption. The total budget calls for \$2,786, of which \$986 is for current overhead expenses, and \$1,800 for proposed additional expenditures, including the purchase of new books and journals (\$600), book-binding (\$800), fees for consultant librarian service (\$200), and miscellaneous supplies and equipment (\$200).

In submitting this budget, which exceeds previous yearly expenditures, it is the desire of the Committee to bring to the attention of the Society that the library cannot continue to function effectively on the budget hitherto allotted, and that the proposed budget represents a most modest expenditure for the privilege of possessing an adequate medical reference library in Hawaii.

The membership approved a budget of \$3,000 for this committee.

N. M. BENYAS, M.D.
Secretary

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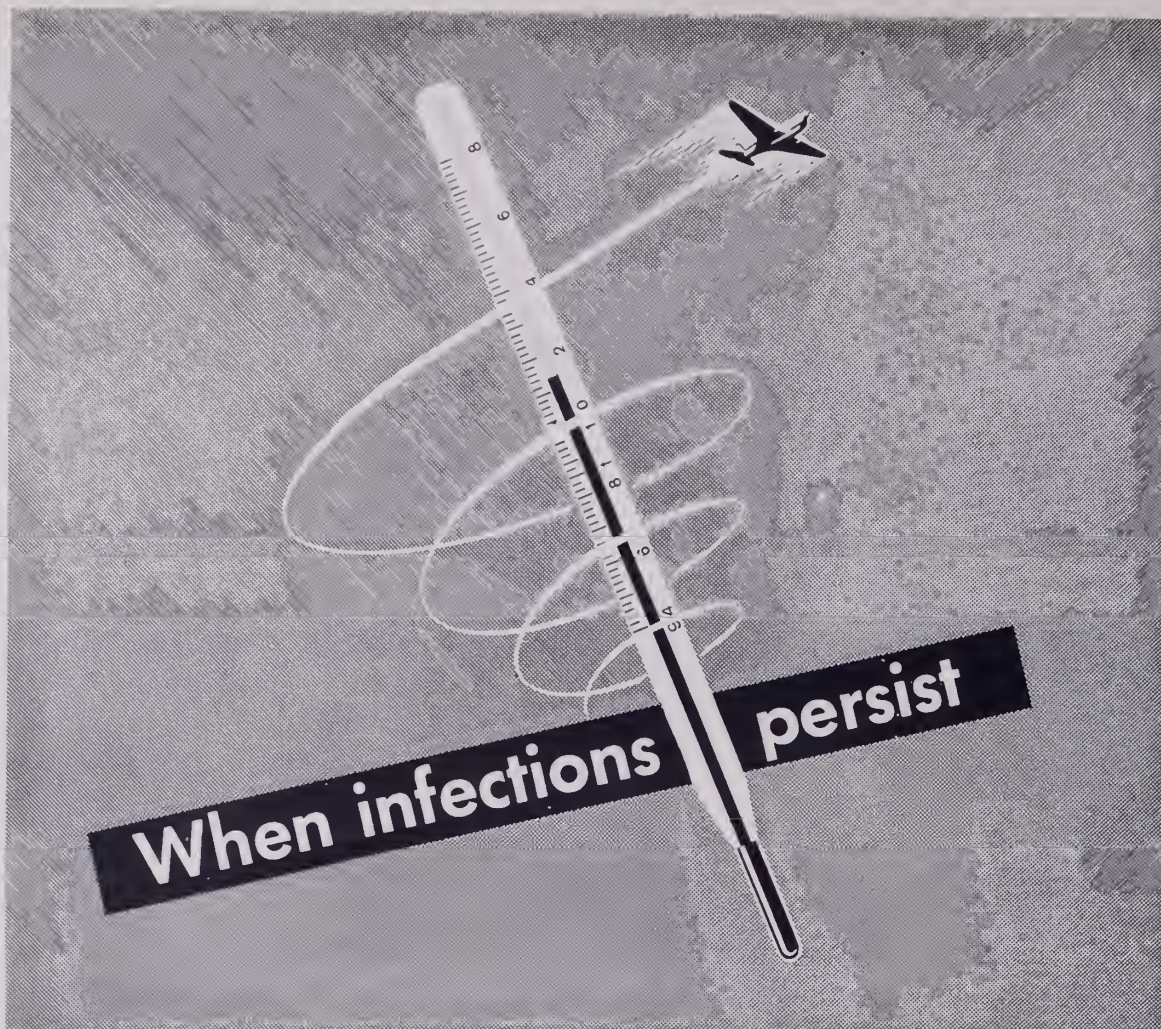
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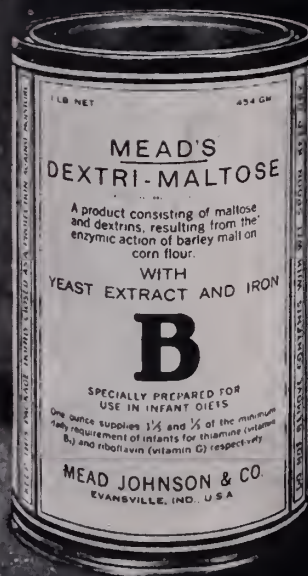
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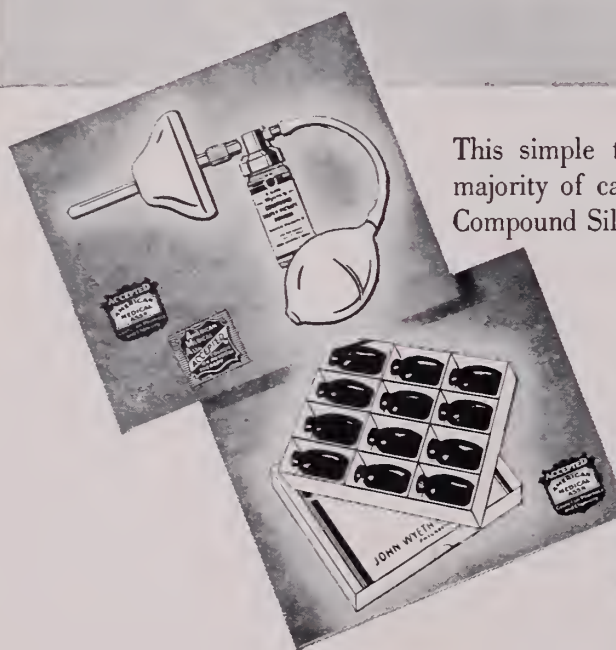
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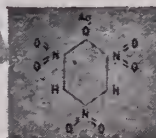
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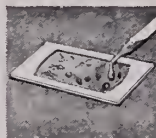
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*Laryngoscope, Feb. 1935, Vol. XLV, No. 2, 149-154. Laryngoscope, Jan. 1937, Vol. XLVII, No. 1, 58-60. Proc. Soc. Exp. Biol. and Med., 1934, 32, 241. N. Y. State Journ. Med., Vol. 35, 6-1-35, No. 11, 590-592



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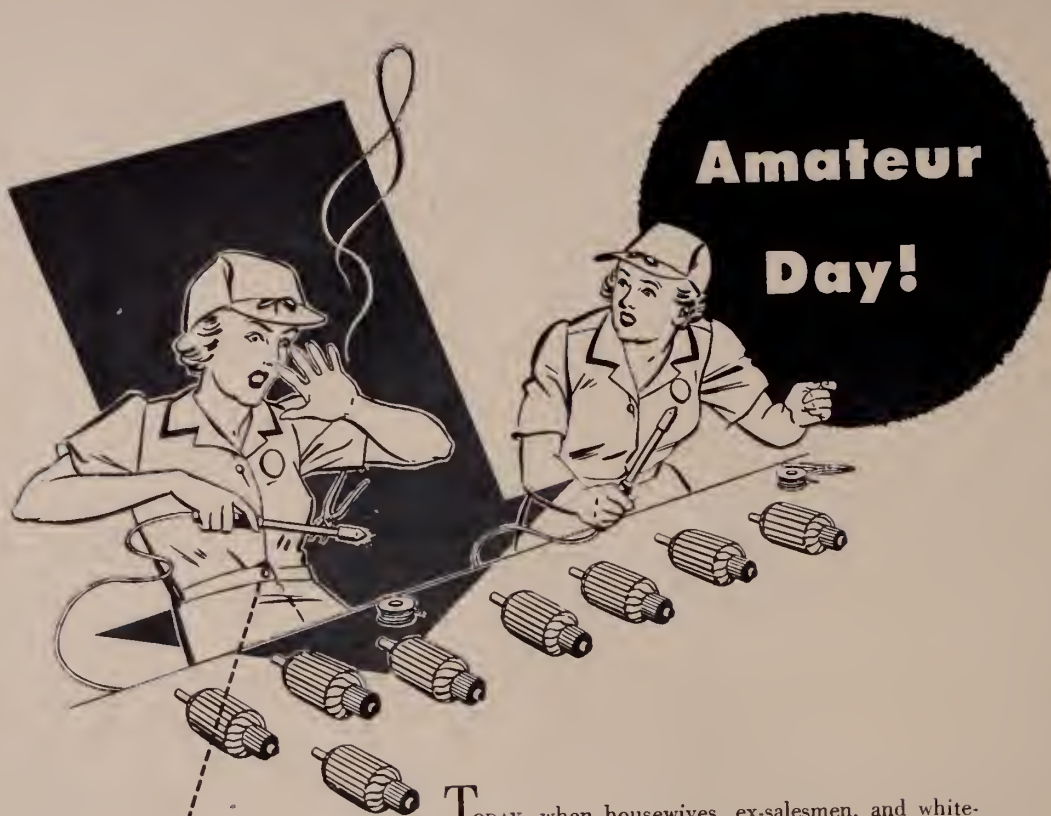
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Dengue Fever: I

JAMES R. ENRIGHT, M. D.*
Honolulu

An analysis of the symptomatology of 141 positive cases of dengue fever is presented. Findings were tabulated under the headings "positive", "negative", "doubtful" and "no history". In the beginning, several of the symptoms were not tabulated and no history was obtained in certain categories. Again, certain cases were hospitalized or reported directly to the Board of Health and a study of the symptomatology was incomplete.

Upon receipt of information of a suspected case of dengue fever, a public health nurse makes a call, and places a net over the patient (if seen during first four days of illness). After the infective stage the nurse calls again, and the net is picked up.

At the same time that the nurse is informed of the case, the Bureau of Sanitation is notified and a squad goes to the home of the patient for thorough spraying and a hunt for breeding places. If indicated, the patient's place of business is also treated.

As there are no practicable laboratory procedures for diagnosis, the decision as to whether the disease is or is not dengue rests upon judgment and careful questioning. A blood count is a great help if taken in time.

CLINICAL PICTURE

The history of a typical case is as follows:

Sudden onset, with fever, severe headache and pain back of the eyes, especially on moving the eyes. Many patients can name the hour of onset. In describing the headache patients characteristically point with both index fingers to the outer part of the orbits, just above the malar prominence. They may also point to the occiput, but nearly always mention the eyes first. They describe the backache as low, often referring to it as "pain in the kidneys." The "bones ache"—they "feel like an old man"—or they "thought they bumped their shins, they hurt so." Usually in a day they feel better and may go to work for a while, but usually on the third or fourth day there is a return in greater degree of all their symptoms with a feeling of apathy and a rise in temperature. (This corresponds to a history of "saddle back" temperature.) At this time a rash may be present and may be missed by the patient, but usually there is itching of the palms and/or soles. They rapidly get better, appetite improves, and they are themselves again on about the eighth day, although symptoms may last much longer in some cases. They usually have no upper respiratory symp-

toms, as cough or cold, running nose, etc., but may complain of sore throat, aphthous stomatitis or "fever blisters."

ANALYSIS OF SYMPTOMS

An analysis of the symptoms of 141 cases follows:

Primary rash: positive, 40; negative, 27; doubtful, 18; no history, 56. This rash usually is an erythematous flush like a light sunburn, which may accompany any fever. Most patients do not notice it and give a negative answer. No circumoral pallor has been noticed. The high positive count was due to early cases being seen by the writer and private physicians, which usually meant that the patient had been to the doctor's office—a practice to be discouraged.

Terminal rash: positive, 87; negative, 11; doubtful, 1; no history, 56. This rash is one of the most diagnostic features of dengue, and usually appears during the second *rise* in temperature, not usually *after* or *during* the second fall in temperature. It may be delayed, however, for as long as a week. It varies from a light macular rash resembling German measles to a blotchy, easily apparent rash beginning on the arms and spreading over the chest. It is sometimes extremely evanescent and can easily be missed. Close examination and questioning are required. It resembles an ordinary toxic rash.

Headaches: positive, 109; negative, 3; doubtful, 0; no history, 29. The headache is characteristic. It may be a deep pain behind the eyeballs, or it may be occipital. Only occasionally is it frontal, and if so, careful questioning as regards sinusitis is indicated.

Post-orbital pain: Positive, 95; negative, 7; doubtful, 2; no history, 37. This is a variety of headache. The pain in the eyes is deep and appears to be muscular in nature, as the patient complains of pain on moving the eyes. Patients complain bitterly of headache, post-orbital pain and backache, these categories receiving more "three plus" ratings than any others. It is definitely worse than in influenza.

Upper respiratory symptoms: positive, 15; negative, 93; doubtful, 2; no history, 31. Most of the upper respiratory symptoms consist of sore throats, usually of one day's duration. With definite history of running eyes, running nose, cough, or common cold, the diagnosis of dengue is doubtful except in the presence of nearly all other typical findings. An effort should be made, in the case of upper respiratory symptoms, to determine if these symptoms were present *before* the onset of the dengue syndrome.

*Director, Bureau of Communicable Diseases, Territorial Board of Health.

Fever: positive, 114; negative, 1; doubtful, 0; no history, 26. There should always be a rise in temperature in dengue. The negative case should probably be recorded as "doubtful," though no rise in temperature was recorded by the visiting public health nurse. The temperature averages about 102 F. but may reach 104 F. and cause delirium. In one case in a 13 months old infant it reached 107 F.

Saddle back temperature: positive, 53; negative, 14; doubtful, 11; no history, 63. This is a characteristic sign of dengue. The temperature is up the first two days, returning to normal or near normal on the third or fourth day, and then rises again to about as high as, or higher than, during the primary rise. After the second fall, the patient recovers. It is to be noted that during the second rise, the terminal rash appears, but as this is usually over four days from onset, the patient can no longer infect a feeding mosquito.

Backache: positive, 101; negative, 7; doubtful, 0; no history, 33. This is the most common complaint in dengue, and, unfortunately, in flu also. It is usually referred to the kidney area and causes most of the patients to take to bed. It is supposed to give the patient a stiff, dandified type of walk, but I have not observed this. Patients point it out by placing both hands on the back in the kidney region. They do not use one hand on the sacral area. In about half it is severe enough to rate two- or three-plus.

Sleeplessness: positive, 67; negative, 20; doubtful, 5; no history, 49. This is usually for one or two nights only and is not definitely associated with either the first or second rise in temperature.

Loss of appetite: positive, 99; negative, 6; doubtful, 0; no history, 36.

Nausea: positive, 41; negative, 27; doubtful, 1; no history, 72.

Vomiting: positive, 33; negative, 61; doubtful, 3; no history, 46.

The above three are closely related to temperature rise and medicaments. Loss of appetite is common, while the frequency of nausea and vomiting may directly depend upon drugs. For instance, some doctors have given sulfa drugs (which, by the way, have no effect on the course of the disease) and many give codeine or other narcotics as well as barbiturates and aspirin to combat the terrific head and back aches. These are sometimes followed by nausea and vomiting. They frequently occur, however, in untreated patients.

Sweating: positive, 72; negative, 18; doubtful, 3; no history, 48. Sweating occurred in half or more of the cases. It usually is not a perspiring due to climatic conditions, but a drenching sweat that leaves the hair dripping and requires several changes of night clothes. Occasionally it may be severe enough

to cause muscle cramps due to salt elimination, and salt tablets should be given to combat this.

Diarrhoea: positive, 23; negative, 56; doubtful, 2; no history, 60. This is also closely connected with drug treatment. Usually a dengue fever patient is constipated, and cathartics are given. In the untreated cases, it appears with the terminal rash and may be due to the enanthem which is probably present.

Itching: positive, 47; negative, 52; doubtful, 1; no history, 41. This is a characteristic symptom of dengue that follows the terminal rash and may be missed because of the inconvenience of a third visit. Seen in hospitalized cases, the itching is usually at the base of the thumbs, the palms, and the soles. It may be very annoying and intractable.

Peeling: positive, 19; negative, 58; doubtful, 4; no history, 60. This is another late manifestation of dengue that may be missed. The peeling usually accompanies the itching and is of a branny or furfuraceous type resembling dandruff. It usually occurs on the palms and soles.

Depression: positive, 32; negative, 52; doubtful, 4; no history, 53. The deep depression characteristic of text book dengue is definitely absent in the present epidemic. The 32 positive are relative, and in them the term applies to the apathy and indifference of the patient which is common. Only a few patients were depressed to the point where they sobbed continually. This was a prominent symptom of the dengue epidemics in the past, and gave it the name of "boohoo fever." The apathy and depression, however, may last for a week or more following recovery.

Adenitis: positive, 9; negative, 34; doubtful, 0; no history, 98.

Herpes: positive, 4; negative, 33; doubtful, 0; no history, 10.

Stomatitis: positive, 5; negative, 32; doubtful, 0; no history, 104.

These symptoms were only classified late in the study, and are not sufficiently analyzed. Adenitis, when present, usually occurs in the occipital glands. It may occur in the post-cervical chain and confuse a differential diagnosis between dengue and German measles if the posterior auricular glands are involved as well.

Epistaxis: rare—occurred in only one case, to my knowledge.

Leucopenia: This is one of the important diagnostic criteria. A leucopenia is present, and usually a relative lymphocytosis. Of 38 white counts available, the average is 4,200 cells per cu.mm. The lowest was 1,450, and the highest, 7,500. The lowest counts occurred about the second or third day, and then tended to rise.

Examples: R. W. Onset 8-7-43. Count on 8-10, 2,650 cells, Polys 37%, Lmphs 49%, Monos 14%.

K. N. Onset 8-9-43. Count on 8-11, 1,200 cells, Polys 58%, Lymphs 42%.

F. A. Onset 8-21-43. Count on 8-23, 3,800 cells, Lymphs 63%.

Laboratory tests: There is no laboratory test for dengue. It must also be kept in mind that, with population immunized against typhoid, as exists in

the Territory of Hawaii, there is a possibility that any fever may raise the antibody titre against typhoid or paratyphoid. It is possible that a negative agglutination against typhoid may be noted early in dengue, which may rise as high as 1/320 during the course of the disease. It seldom rises higher, depends on individual characteristics and usually quickly subsides following recovery.

Dengue Fever: II

REVIEW AND REPORT OF THREE CASES

F. D. NANCE, M. D.
Honolulu

I am presenting cases from the contagious disease section of The Queen's Hospital, not because I feel qualified to tell you anything about dengue but because I feel it should be drawn to your attention that the disease has recently made its appearance in Honolulu. In view of this fact it seems worthwhile to refresh your memories as to the salient features of this disease.

A. F., age 30, worker at Pearl Harbor, resident here for more than one year, had, on July 29, 1942, an acute onset of fever, violent headache, pain in the eyes and backache. There were no respiratory or urinary symptoms. On Saturday, July 31, he felt better and fever seemed abated. However, on Sunday, August 1, symptoms again returned and he called me to see him. Examination showed temperature 104 F. and marked prostration. The mucous membranes of the mouth were dry and reddened. Chest was clear. There was a scattered maculopapular rash on the hands, arms and trunk. By August 2, the rash covered most of the body, including the palms. On August 3, fever fell by crisis and symptoms cleared. Laboratory findings were normal with the exception of a leukopenia—2,900 white blood cells.

The symptoms and course of this case give a clear-cut picture of dengue. Some idea of the route by which infection reached this man may be obtained from two other cases seen recently at The Queen's Hospital. Both had histories almost identical with the case just presented.

E. P. H., Pan American pilot, arrived in Honolulu on July 19, on the fourth day of his disease. The rash appeared on the fifth day, and fever cleared on the same day. He was cared for in The Queen's Hospital from the time of his arrival. His itinerary had included Suva, where an epidemic of dengue is now in progress.

L. S., Pan American pilot, was admitted to The Queen's Hospital on July 25 on the fifth day of his disease. The rash was present on admission. Temperature fell on the day of admission. He had also just come from Suva.

Dengue fever is an acute virus infection, mosquito-borne, which has quite characteristic symptoms and course and generally a characteristic rash. It has been definitely proven to be transmitted by mosquitoes and at least two species, *Aedes albopictus* and *Aedes*

aegypti, have been used in successful inoculation experiments.

Dengue is a disease of three stages, as follows:

- (1) Invasion, lasting 2-5 days
- (2) Remission, lasting from twelve hours to three days
- (3) Return of symptoms of invasion, lasting one to two days.

The onset is sudden, prostration is intense, and the most constant symptom is headache, usually described as being localized to the eyes. There are also pains in any or all parts of the body, but generally localized in the back, legs and joints. The fever often reaches quite high levels. The symptoms and fever during the second elevation are generally less intense than during the first.

Two skin manifestations are seen. During the first accession of fever there is vasomotor erythema, usually most marked on the face, which may be quite swollen. During the second accession a true rash appears in a majority of cases, usually a macular-papular rash midway in type between measles and scarlet fever. It usually appears first on hands and arms, and extends thence to trunk and legs. Usually it is present on the palms, and sometimes on the soles. There is usually a leukopenia at the time of the rash.

Treatment at present is entirely symptomatic. The disease is self-limited and practically never fatal. Complications are rare and consist of hemorrhages from mucous membranes and occasional relapses.

I have little to add from personal observation. I have seen the disease only in the sub-tropical climates of Honolulu and Shanghai. I have the impression that the disease is modified by climate in two respects: First, the symptoms in those cases I have seen are less severe than those described in the tropics, backaches often being absent, and the sole complaint intense headache and pain in the eyes; second, the period of remission seems to be quite short, and when temperatures have not been taken, it may be impossible to chart a history of it.

The Medical Group, Punchbowl St.

Bubonic Plague on the Island of Hawaii

C. L. CARTER, M. D.

Honokaa, Hawaii

Plague has been endemic on the Island of Hawaii from 1900 up to the present time, with the greater proportion of cases occurring in the Hamakua* section.

It has been my privilege to handle plague cases on the Hamakua coast for the past twenty-seven years. We have had an average of at least 2 cases a year up until 1935, with an annual high of 12 cases in 1922. From 1935 to 1939 there were no human cases; in 1939 there was 1 case of pneumonic plague; from 1939 to 1943 there were no cases. In 1943 we have already had 4.

Plague (Oriental plague, black death, or pestis are synonyms) is a specific acute infectious disease caused by *Pasteurella pestis* and characterized, in the bubonic types, by enlargement of the lymphatic glands, toxemia, and initial lesions; and in the pneumonic and septicemic types, by a specific form of pneumonia or septicemia.

Plague is primarily a disease of rats and other rodents and is transmitted from rodents to man by certain species of fleas.

ETIOLOGY

The cause of plague is a bacillus discovered independently by Yersin and Kitasato in 1904. It is called *Pasteurella pestis* and is an oval bacillus showing polar staining with the ordinary bacterial stains. It is found in the lymphatic glands, liver, spleen, and lungs of persons dead of the disease, and in the blood stream in the septicemic type of plague.

EPIDEMIOLOGY

In considering the epidemiology of plague, it should be remembered that it is primarily a disease of rats or other rodents and only secondarily a disease of man.

It is transmitted from the rat to man by two types of fleas—*Xenopsylla cheopis* and *Nosopsyllus* (formerly *Ceratopsyllus*) *fasciatus*.

Many rodents other than the rat are naturally infected with plague—the ground squirrel, the marmot, the tree squirrel, the white-tailed guinea pig, the gray squirrel, and the mongoose.

Rattus norvegicus, the brown or sewer rat, and *rattus rattus*, or the ordinary black house rat, are the usual hosts of plague. *Rattus hawaiiensis* and *alexandrinus* also harbor the disease.

Cyril Pemberton, entomologist of the Hawaiian Sugar Planters' Association, in 1920 found the rat flea to be present on four types of Hawaiian rats and also on mice. The rodent plague in Hamakua in 1942 was almost exclusively borne by *Rattus hawaiiensis*. Plague fleas were also found on the mongoose although to date there is no history of rodent plague in the mongoose on the Island of Hawaii.

At the time of Mr. Pemberton's extensive examination, hundreds of fleas were examined from dogs and cats and not one was the plague-carrying type. This was of particular interest, because many dozens of dogs were slaughtered in an all-out campaign against plague.

The mechanism of transmission of plague from rats to humans was discovered by Bacot and Martin in 1914. The flea that infests a plague rat swallows numerous plague bacilli. They grow and multiply in the proventriculus of his stomach to such an extent as to obstruct it. When he subsequently leaves the rat, after its death, and bites a human being, he tries to suck the blood from the human being and force it down the esophagus into the stomach, but is stopped from doing so by the obstructed esophagus, and is forced to regurgitate the plague bacilli from the proventriculus of the stomach into the wound he has produced by biting the human.

Clothing may act as the transmitting agent, the infected fleas hidden in them transmitting the disease from place to place.

Pneumonic plague is extremely contagious; it is transmitted directly from man to man by droplet infection or direct contact with the sputum, which contains myriads of the bacilli. Epidemics of pneumonic plague have their origin in cases of pneumonia occurring in patients suffering with bubonic plague.

There is no natural immunity to plague in any race, and all ages and both sexes are equally susceptible. Epidemics are most common where the mean temperature is between 50 and 85 degrees, and the prevalence of rodent plague on the Island of Hawaii may be explained by the mean temperatures which exist in the Hamakua section. The bacillus resists freezing but is quickly killed by exposure to direct sunlight or drying.

SYMPTOMATOLOGY

The incubation period of plague is believed to be

* The sugar-cane-covered middle portion of the northeast (windward) side of the island.—Ed.

from two to five days, though some authorities place it as high as ten days.

There are two types of plague: (1) *pestis minor*, and (2) *pestis major*, which includes bubonic plague, pneumonic plague and septicemic plague.

Pestis minor includes those cases of mild plague characterized by slight fever, enlarged lymphatic glands in the region of the flea bite, and mild general symptoms including headache, aching in the back and limbs, anorexia and general malaise. A characteristic facies and a rather slight punctate rash are present in most cases.

I have had no experience in diagnosing *pestis minor*. Out of many, many dozen lymphatic glands removed for diagnostic purposes, I have never diagnosed a case of *pestis minor*.

Bubonic plague has a sudden onset in most cases, although a definite period of malaise may precede the onset. The patient is rapidly overcome by the toxemia present and often presents the appearance of alcoholic intoxication. The fever rises rapidly to 103-104 F. or higher. The face is pale and anxious at first, but as the fever rises becomes flushed. The conjunctivae are congested and the skin is hot and dry. Chills or chilly sensations may be present. Pulse and respiration are increased with the fever and there is usually extreme prostration.

After the fever has reached its height the mental condition is one of stupor, the patient appearing stupid when questioned, with marked difficulty of concentration; speech is interfered with, and there may be slight delirium. At the height of the attack the face is greatly flushed, vomiting and diarrhea may be present and symptoms of toxemia are prominent. Albumin may appear in the urine and there may be marked delirium.

In cases that recover, the temperature is remittent and falls by lysis on the fourth or fifth day. In my own series of cases, I have had some that lasted eight days, and one Portuguese man from Paa Mo expired after having had the disease for fourteen days. Fatal infections usually last from three to six days before death occurs.

One case, autopsied on May 28, 1943, had some rather unusual symptoms. There was an extensive sub-peritoneal hemorrhage over the two psoas muscles, which extended down into the pelvis to the base of the bladder. This case was also extraordinary in view of the fact that he passed large amounts of blood by the bowel. We found multiple ulcers of diverse sizes and shapes over the entire mucous lining of the stomach and there was sub-mucosal hemorrhage involving the entire lining of the mucous membrane of the stomach. There was not, at the same time, any hemorrhage in the duodenum, jejunum, ileum or large bowel.

This case was diagnosed as bubonic plague due to the presence of a very typical bubo in the left inguinal region, when the duration of the disease was only

two days. It was suggested by the pathologist that the liver and spleen suggested this as a typical septicemic type of plague.

Injections of 100 cc. of 1 per cent mercurochrome were given daily for five days. It localized around the bubo in the right inguinal region, making the area just as red as though the mercurochrome had been injected directly into the skin and deeper tissues around the bubo.

It was interesting that this case lived for 14 days and was walking around in the yard when he suddenly had a cardiac collapse and died almost instantly.

Pneumonic plague is rare. The onset is very sudden with a rise in temperature to 102-104 F., and an exaggeration of the symptoms if this occurs as a complication during an attack of bubonic plague. There are cough, dyspnoea, rapid respiration, pain in the chest, marked toxemia and expectoration of large amounts of brownish sputum. The "prune juice" sputum characteristic of this type of plague contains enormous quantities of plague bacilli. The physical signs are indefinite, resembling those of bronchopneumonia, there being moist rales over the bases of the lungs and limited areas of consolidation scattered throughout the lungs.

Septicemic plague resembles bubonic plague except that buboes do not occur. The course of the disease is very rapid, death occurring in two or three days. In this form the bacilli occur in large quantities in the peripheral blood; smears of this may show them, but blood cultures should be relied upon for diagnosis. Toxemia is very marked and may kill the individual within twenty-four hours. There may be little fever; prostration is most severe, and mental torpor, delirium or coma is present before death. This form is more common in children than in adults. The septicemic form of plague is really a very severe form of bubonic plague in which fatal toxemia develops before the buboes have time to appear.

Complications and sequelae are not often observed, due to the sudden demise of the patient. Cardiac angina has been a distressing symptom in two of my cases—in one case at Honokaa Hospital the patient had such severe chest pain that he threw himself out of the bed and landed on the floor, even after an injection of a quarter grain of morphine sulphate.

DIAGNOSIS

The diagnosis of plague can be made by aspiration or removal of part of the bubo and examining this microscopically. Diagnosis of septicemic plague can be made by a blood culture. Diagnosis of pneumonic plague can be made by finding the *pestis* bacilli in the sputum. Final diagnosis of all types can be made only by guinea pig inoculation.

DIFFERENTIAL DIAGNOSIS

Climatic bubo, dengue, tularemia, influenza, yellow fever, typhus, glandular fever, buboes caused

by lymphogranuloma venereum, and pyogenic infections enter into the differential diagnosis.

TREATMENT

No known treatment is effective. Human convalescent serum has been tried, and at one time Haffkine's vaccine was popular. Intravenous mercuriochrome has been tried. Prontosil and other sulfonamides seem in general to be ineffective but perhaps have not been given a fair trial. In general reliance is placed in purely supportive and stimulating measures.

Local treatment of the bubo consists essentially in repeated aspiration or, if necessary, incision and drainage. A mixture of camphor and thymol may be injected into it through a drainage tube, or a 1 per cent solution of iodine in potassium iodide solution may be employed for the same purpose.

PATHOLOGY

The pathology of plague is that of a severe septicemia, the bacilli reaching the blood through the lymphatics which drain the site of the infected flea bite. The bubo may be solitary, with very little sign of external inflammation, or it may be a confluent mass of many lymphatic glands with extravasation of blood into the tissues, thereby presenting the picture of a hemorrhagic boil or carbuncle. Buboes are most common in the inguinal region (75 per cent); next in the axillary lymph glands; and thirdly, in the submaxillary or cervical lymph glands. The organs most often involved are the spleen, liver, lungs and kidneys.

The usual pathology of plague at autopsy is hyperemia of the spleen, liver, kidneys and the lymphatic glands; pneumonic, usually of the bronchial type, in the case of pneumonic plague; and the signs of a general septicemia in the septicemic type. In pneumonic plague authorities have maintained that the pneumonias were always of the bronchial type, but in the few cases of pneumonic plague coming within my experience some were definitely of the lobar type.

The pleura may contain small or large amounts of purulent fluid, or the visceral and the parietal pleura may be adherent in their entirety and covered by a tenacious muco-purulent exudate which may or may not involve both lungs. There may or may not be involvement of the peri-bronchial or the prevertebral lymph nodes.

HISTORY AND GEOGRAPHIC DISTRIBUTION

The history of plague is fascinating. It has been well covered in many works devoted to the subject

and in general literature, as in Defoe's "History of the Plague Year." The great epidemic occurring in the 6th Century A.D., during the reign of Justinian, is well described in Gibbon's "Decline and Fall of the Roman Empire." There is abundant evidence that the Indian physicians recognized this infection hundreds of years before Christ.

Many great pandemics of this disease have occurred, during which Europe, Asia, Africa, North and South America have been invaded, and the name "Black Death" was given to the great pandemic originating in China during the 14th Century.

During epidemics, plague has spread to almost every country in the world, but the present endemic centers are in Mesopotamia, India, China, Uganda, the Philippine Islands, the western United States, and a small center upon the Islands of Hawaii and Maui of the Hawaiian group. Only in India is plague a cause of high morbidity and mortality.

PROPHYLAXIS

(1) Exterminate rats.

(2) Spray under houses, to kill fleas, with such agents as lysol, cresol, chloride of lime, 5 per cent carbolic acid, or 2 per cent formalin solution.

(3) Haffkine's vaccine, consisting of heat-killed cultures of *Pasteurella pestis*. This vaccine has been very extensively used in India and has reduced the incidence of the disease by about 75 per cent and the mortality about 33 per cent, the protection lasting about one year.

(4) Take special contagious precautions in case of pneumonic plague.

The prevention of pneumonic plague consists in the inoculation with plague vaccine of all exposed individuals and the prevention of droplet infection by the wearing of masks made of cotton covered with muslin, as gauze masks are not so efficient as the muslin cotton masks introduced by Strong.

CONCLUSION

The mortality rate of plague in Hawaii, as shown by the Board of Health, is probably 92 per cent; I do not believe it is really that high, for this reason: I have had quite a number of cases that were clinically typically plague but in which I was unable to get a biopsy of the glands, so that the Board of Health could not accept them as bubonic plague. I can appreciate that the Board of Health is definitely doing the right thing in accepting the diagnosis of plague not from the clinical symptoms alone but only from guinea pig inoculations, but this rule results, I believe, in assigning a fictitiously high mortality rate to plague as we see it on Hawaii.

Glomus Tumor of the Wrist

CLINICO-PATHOLOGIC STUDY OF A CASE

RALPH B. CLOWARD, M.D., and I. L. TILDEN, M.D.

Honolulu

The glomus tumor (angioneuromyoma) gives rise to a clinical picture which is clear cut and should be easily recognized. However, since this tumor is comparatively rare, it is seldom considered in the differential diagnosis of painful lesions. We are reporting such a tumor for two reasons: first, because of its unusual location (the wrist) and second, because it developed following trauma. This relationship is of great importance since it emphasizes that a glomus tumor must be considered in the diagnosis and treatment of painful, local, post-traumatic lesions which fail to respond to usual therapeutic measures.

CLINICAL FEATURES

The lesion, usually single, may be found nearly anywhere in the subcutaneous tissues but occurs most often in the upper extremities, particularly the fingers. It consists of a small, purplish, usually palpable nodule varying in diameter from 2 to 10 mm. It is commonly subungual in location, in which case it is not often palpable, although a discolored area may be seen through the nail over the site of the lesion. The most characteristic feature of this peculiar tumor is extreme, often excruciating pain, which may be constant or, more often, intermittent. The pain occurs in crises which may be initiated simply by the touch of clothing or some other light stimulus. For this reason the lesion is frequently extremely disabling. Many patients have vainly sought relief for years simply because the condition was not recognized and treated properly. Treatment consists of simple excision. The pain disappears immediately and the patient is permanently relieved of his symptoms. If the tumor is removed, it does not recur. Locally recurring tumors have been recently reported¹ but this is rare.

LITERATURE

The first clinical description of the lesion now known as glomus tumor was made in 1812 by Wood, who called it "painful subcutaneous tubercle." This early description was followed in the foreign literature by numerous articles describing the tumor as angiosarcoma, perithelioma, neurinoma, false neuroma, angioma and tubular epithelioma.

It was not until 1924, however, that the true nature and origin of this lesion was accurately described by P. Masson². He was the first to give an accurate description of the normal structure which he named "the neuromyoarterial glomus," and to point out the relationship of this structure with the pathologic glomus tumor. The tumor since 1924 has been recognized as a distinct pathologic entity and has stimulated a great deal of work on the anatomy and physiology of the glomus. The most accurate, elaborate and complete anatomical description of the normal arterio-venous anastomosis was made by Popoff³ (1934).

The function of the normal glomus has been studied by Grosser⁴ and others. Numerous case reports of tumors of the glomus body have appeared in the literature since 1924⁵. In a recent survey by Murray and Stout⁶ of 89 different publications, 240 reported cases were found. A much wider distribution of these tumors than the cutaneous-subcutaneous junction is shown by this survey. Tumors have been found on the face, eyelid, penis, axilla, lateral thorax, buttocks, coccygeal region and the neck. No tumor of the wrist has been reported.

HISTOGENESIS

The normal subcutaneous glomus is, in effect, an arteriovenous anastomosis whereby blood is shunted directly from the arterial to the venous system without passing through the capillary bed. According to Radasch⁷ it consists of (1) an afferent arteriole, (2) an anastomotic vessel, (3) a primary collecting vein, (4) intraglomerular reticulum and (5) a capsular portion (fig. 1). The anastomotic vessel (Sucquet-Hoyer canal) is a direct continuation of the afferent arteriole and forms the most important component of the glomus. It is characterized by loss of the internal elastic lamina and longitudinally arranged muscle fibers just beneath the endothelium which give the internal lining a corrugated or ruffle-like appearance. Scattered between the muscle cells of both the longitudinal and circular layers are the peculiar, sharply outlined glomus or epithelioid cells, which are the characteristic cells of the normal glomus. This cell is recognized as a modified smooth muscle cell. It is from these cells that the glomus

CASE REPORT

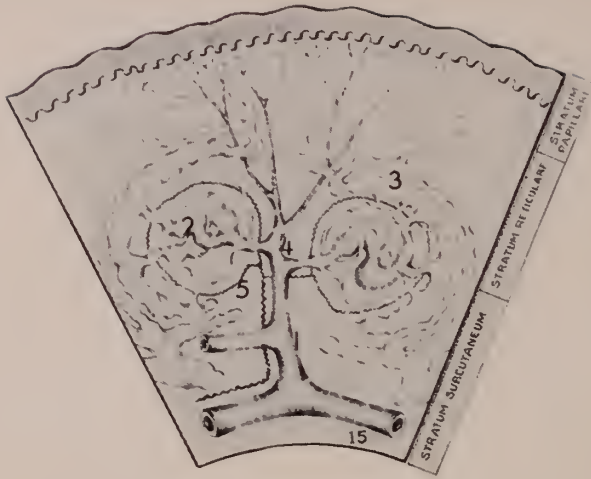


Fig. 1. Semidiagrammatic illustration of the normal glomus. (1) Afferent artery, (2) Sucquet Hoyer canal, (3) primary collecting vein, (4) pregloemic arteriole, (5) nerves. (Reproduced from Popoff.)

tumor arises. By tissue culture, these epithelioid cells have recently been identified as the capillary "pericytes" of Zimmermann⁴.

Many unmyelinated nerve fibers are found about the anastomotic vessel and in the collagenous capsule which envelops the structure. These give a clue to the function of the glomus which, according to Popoff, is "to control arteriovenous circulation in the digits (skin) and to regulate both the local and general temperature of the body."

The explanation of the pain induced by pressure upon a tumor of the glomus is found in these numerous unmyelinated nerve fibers. These fibers are part of the periarterial sympathetic plexus and follow the arteriole into the glomus. They are "naked" axis-cylinders or uninsulated fibrils which ramify among the cells in the wall of the vessel. They are similar to the nerves found in the cornea, where the only form of sensibility is that of pain. When proliferation of "epithelioid" cells occurs forming the glomal tumor, there is also proliferation of these nerve fibers.

It is an old saying that "pain is the cry of a nerve deprived of its blood supply." When these tumors are irritated, either by trauma or temperature changes, two disagreeable sensations result: an immediate lancinating pain, followed by a more lasting burning sensation. The initial pain is thought to be due to pressure from sudden swelling of the lesion producing an ischemia of the nerve fibers. The burning (thermalgia) is a local vasomotor phenomenon arising from this sympathetic stimulation.

G. D., 41 year old Caucasian man was referred to one of us (R. B. C.) by Dr. H. M. Johnson on January 23, 1942, for treatment of a painful area on the left wrist. The patient stated that in August, 1941, five months before, he had accidentally struck his left wrist against a steel bar. The blow was not severe, just a bump, not even bruising the skin. However, the tenderness which usually follows such a minor injury failed to disappear in the usual length of time. After three weeks he reported to the dispensary, where x-rays were taken; these were reported negative. He was given local treatments with heat, ultra violet light and diathermy, none of which gave him any relief. In the next four months the same local pain continued regardless of treatment. He was eventually refused compensation as a malingerer.

The patient indicated a small area on the radial side of the left wrist about three inches above the joint which he stated was excruciatingly painful to even slight touch. If he moved his arm at night and happened to touch the spot, the pain would awaken him. He described the pain as sharp and stabbing with a dull burning sensation persisting after the initial severe attack had subsided. It did not radiate up the arm or down into the fingers but remained in one small area which could be covered with a dime. He was unable to work because of the constant irritation.

Examination revealed no change in the sensation of the skin over the painful area or of the hand or fingers. There was no local muscle weakness. Palpation of the area for a mass beneath was difficult, causing the patient to wince and cry out with pain; however, no obvious mass could be felt. The clinical diagnosis was post-traumatic neurinoma or causalgia.

Subcutaneous infiltration with 1 cc. of 1 per cent novocaine solution completely abolished the pain, but after 2 or 3 hours it returned, as severe as before. After 3 such injections with no relief, surgical exploration of the area was advised.

The patient was admitted to the St. Francis Hospital on March 3, 1942. With the aid of novocaine anesthesia and an Esmarch elastic bandage for complete hemostasis, a 2 cm. incision was made over the painful area. Immediately beneath the skin, embedded in the subcutaneous fat, was a small nodule about ½ cm. in diameter, having a dark red color which stood out in striking contrast to the surrounding white bloodless field. A medium sized vessel was seen to enter and leave the lesion. The vessel was tied on each side and the nodule resected in toto. It was thought to be an arterio-venous aneurysm, and its true nature was not discovered until histologic sections were examined.

PATHOLOGIC EXAMINATION

After formalin fixation the tumor consisted of a small, firm, white nodule exactly 5 mm. in diameter. It resembled a small lymph node.

Microscopic study disclosed an interesting picture. A large, thick-walled, irregular blood vessel made up approximately one-half of the tumor. The internal elastic lamina was missing. There were numerous irregular outpouchings into the lumen and the endothelial lining was unusually distinct, actually cuboidal in nature in certain fields. Trichrome stains

showed the wall to consist chiefly of muscle cells both longitudinally and circularly arranged, with a few bundles of collagen toward the periphery. Adjoining the wall were masses of sharply outlined cells characterized by clear vacuolated cytoplasm and uniformly staining round nuclei. The remainder of the tumor consisted of innumerable small endothelial-lined spaces surrounded by similar masses of epithelioid cells arranged in concentric layers about

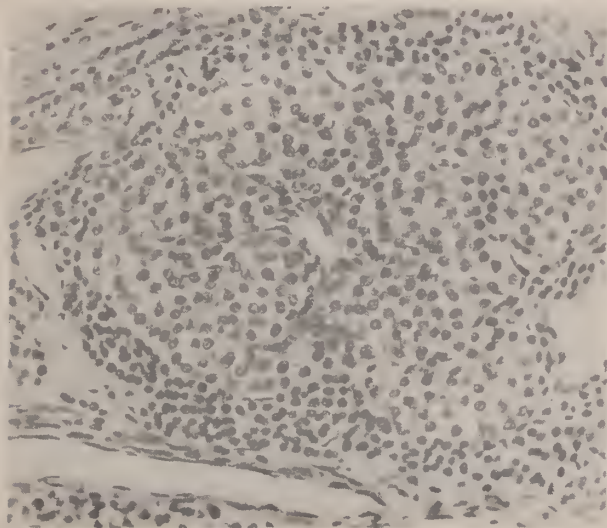


Fig. 2. Photomicrograph of the glomus tumor. At least 5 small centrally located endothelial lined spaces may be seen, each surrounded by layer upon layer of sharply outlined pale staining "epithelioid" (glomus) cells.

the lumen of the spaces (fig. 2). A thin but definite capsule made up of collagen was present and nerve fiber stains revealed a number of fine unmyelinated fibers which were most numerous in the region of the large vessel.

COMMENT

This case is of particular interest from an industrial accident standpoint. Since the presence of a glomus tumor was not recognized, and since the patient's symptoms stubbornly resisted all types of

treatment, the diagnosis of malingering seemed justifiable. It is easy to see how a diagnosis of post-traumatic causalgia, hysteria or malingering might be made in such a case, where the severity of the patient's complaints are so far out of proportion to the local findings. Nevertheless, if this lesion is kept in mind and more of these painful areas which resist treatment are explored surgically, unjust decisions in industrial cases may be prevented.

SUMMARY

1. A glomus tumor of the wrist, traumatic in origin, is reported.
2. The histogenesis and pathology of the lesion is described.
3. A plea is made for the consideration of this tumor as a possible cause of post-traumatic pain which does not respond to treatment. Errors in the diagnosis of industrial cases may thus be avoided.

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An Investigation of Tattooing in Honolulu

BERNARD WITLIN, Sc. D.*

Honolulu

Partly as a result of the increase of military and civilian concentrations of population, reports of infection resulting from tattooing were received in 1943 by the Board of Health from medical officers of the Army and Navy. The author was assigned to an investigation which resulted in the following report.

It is known that most tattooers practice their profession in either large ports or cities near concentrations of armed forces, or near large centers of migratory workers. The City and County of Honolulu fits well into all of these categories. Investigation revealed that there are eight tattooing establishments in Honolulu with thirty-three individuals engaged in the profession. Each tattooing shop has an average of four "skin-engraving" artists, two of whom are usually the apprentices of the principal operator, who has learned his art as an apprentice in California, the Philippines or Japan. Four establishments employ girls in their late teens or early twenties as tattoo artists, primarily as an added attraction to the male patrons. Two organizations employ 15 year old boys as tattooers, permission for such employment having been cleared through the Labor Board.

Between 300 and 500 individuals are tattooed daily in Honolulu, at prices ranging from \$2.50 to \$12.50 per design. The average tattoo costs \$3.50. Of these customers approximately 65 per cent are non-commissioned Navy personnel, 25 per cent are enlisted Army personnel, and the remaining 10 per cent are defense workers. Approximately 80 per cent of those being tattooed are in their late teens or early twenties. Racially, they are approximately 90 per cent Caucasian, 5 per cent Filipino, 3 per cent Oriental, and 2 per cent Negro.

Little effort has been made in Hawaii or on the mainland to control the business of tattooing, because the need for control has not been great prior to this time.

Interviews with representative recipients of the skin markings revealed their reasons for acquiring such permanent marks to be as follows:

- (1) To have a permanent identification on them at all times, name or number. One male, aged twenty-one, was having his Social Security number applied when interviewed; this practice is being encouraged by the tattooers by offering a special price of \$1.50 for such tautotomy. In one in-

stance, an Army Colonel of the field artillery and his complete staff, including a major in the medical corps, were all having their army serial numbers and blood types tattooed on their right arms and left thighs "as an emergency measure, in case the identification tags on one of the identifying limbs should be blown off."

- (2) To take home a tattooed souvenir from Hawaii, such as "HAWAII-1942" or the reproduction of a sinking ship with the words "Remember Pearl Harbor" across the stern or side.
- (3) As a seemingly obligatory initiation ceremonial into their service such as the letters USN through the center of an anchor.
- (4) To be a "regular guy" or "one of the boys."
- (5) As a memento of a first sexual experience (with a prostitute).

The tattoo shops all have signs to the effect that minors under the age of eighteen are not allowed. In the opinion of the operators, tattooing, in the majority of cases, is performed while the subject is under the influence of alcohol.

REGULATIONS

Regulations concerning tattooing practices are almost non-existent. The Navy in 1904 issued a circular stating in connection with recruiting¹ that "Indecent or obscene tattooing is cause for rejection, but the applicant should be given an opportunity to alter the design, in which event he may, if otherwise qualified, be accepted." With the exception of Cleveland, Norfolk and San Francisco, no regulations or ordinances could be found controlling the practice of tattooing.

Honolulu has had no specific regulations covering the activities of individuals engaged in tattooing. The importance of such regulations was brought to the fore by reports of secondary infections resulting from the practice.

Reports in the literature indicate that serious complications resulting from tattooing are in large measure due to the methods employed and the precautions used to prevent infection during and after the operation. Complications recorded as the result of faulty and non-aseptic techniques are septicemia, gangrene, tetanus, leprosy, tuberculosis and syphilis. A notable example of disease communication by tat-

* Bacteriologist, States Relations Division, U. S. Public Health Service, Assigned to the Board of Health, Territory of Hawaii.

¹ Parry, Albert: Tattoo, Simon & Schuster, 1933

too is that of a twenty-six year old tattooer-vagrant named James Kelly.² In 1877 he entered a Philadelphia hospital for the fourth time. Earlier in the year he had been treated for syphilis, and while at the hospital he gratuitously tattooed—and infected—21 other patients and a male nurse. The spread of syphilis was definitely traced to his habit of moistening the tattoo needles in his mouth and mixing his pigments with saliva. Some cities, among them Seattle, have their health department inspectors periodically see to it that tattooers employ aseptic methods and sterilized instruments.

On June 18, 1942, the Board of Supervisors of the City and County of Honolulu provided for the issuance of permits to individuals engaged in the tattooing profession (Revised City and County Ordinances, Nos. 1179 to 1182 inclusive). Until this date there were no specific regulations governing persons or establishments engaged in tattooing within the Territory of Hawaii. The issuance of permits and the enforcement of the revised ordinances were assigned to the Honolulu Police Department who, by September 15, 1942, required compliance as follows:

1. All operators or technicians engaged in tattooing must obtain permits.
2. Applicants must appear in person to file permit applications, have their application papers notarized and be fingerprinted.
3. The application must be accompanied by two affidavits as to character signed by two persons.
4. Tax clearance papers must be submitted.
5. Investigation of fingerprints and a search for criminal record is made.
6. If the applicant possesses a record of moral turpitude or felony, the permit is denied.

To date all applicants have been granted permits since all have had clear police records.

None of the foregoing regulations prescribe precautions to be taken in tattooing.

TECHNIQUE

The area to be tattooed is washed with a sponge containing an approximately 2 per cent solution of Cresol or Lysol (1 tablespoon to a quart of tap water) and the hair within the immediate area is removed by shaving with a straight razor. The area is dried with a clean piece of cloth or a paper napkin and a thin layer of carbolated vaseline (1.5 per cent phenol in solid yellow petrolatum) is smeared over the shaved area. A celluloid stencil is applied as follows: The cuts in the stencil bearing the selected design are filled with powdered charcoal or lampblack by rubbing the black powder over the stencil with the fingers. The stencil is touched to the exact site desired for transfer of the outline and the charcoal

in the stencil slits is transferred by adhesion to the vaselined skin, thus producing a tracing outline of the design upon the skin.

All the establishments in Honolulu employ electrical tattooing machines, and by cooperation within the trade itself have standardized their methods. It is generally conceded that the electric process diminishes the chances of postoperative infection because it shortens the time required for the operation and the severity of scaling. The electric machine is a pistol-shaped instrument, the barrel of which contains a needle bar to which is soldered a group of fine steel needles. Two needle arrangements are used in tattooing: the outline puncher, and the filler or shader. The outline puncher consists of two to seven needles (English Sharpees, No. 11 or No. 12), usually four, arranged in a circular conical funnel to produce a fine point, its purpose being to make a fine outline of the design. The filler or shader consists of six to twelve, usually six to eight, of the same size needles soldered to the bar in a straight line, its purpose being to cover as large an area as possible at one time in filling in or shading the design described by the outline puncher.

After the needles are soldered to the bars, they are placed in a container of lysol or liquor cresolis saponatus USP XI (full strength) for at least thirty minutes. Prior to use the needles are rinsed in a 2 per cent lysol solution followed by distilled water to prevent damage by the caustic action of the chemical. In some establishments the needles are left in the cresol for about an hour, rinsed, shaken dry and when placed in a jar of carbolated vaseline to prevent rusting. In other establishments, needles are unsoldered by heat and discarded after one day's use. The operators claim that it is more economical to dispose of the needles, and that they are thereby assured of constantly sharp needles, which produce less pain during the operation.

The needle bar and needles are moved rapidly up and down by the vibration of a support breached across two electric coils which form the butt of the pistol. The magnetic coils operate in the same manner as a door bell (annunciator) or a spark coil. The rate of vibration is controlled by a rheostat which is apart from the machine proper and usually serves for a series of such machines. Although the machine is capable of 3000 jabs per minute, the average operating speed is around 1000.

Needles are adjusted so that the skin is punctured for an "intradermal" instillation of the pigment. They seldom draw blood; according to the operators, they puncture no deeper than 1/32nd or 1/64th of an inch, to the prickle cell layer. This is probably erroneous, the pigment actually being deposited in the subpapillary layer of the corium. The sensation produced by the needle is that of a slight burn or insect sting.

² Maurry, F. F. and Dulles, C. W., *Am. J. Med. Sci.*, Jan., 1878

The dyes used for intradermal instillations are chiefly of vegetable origin, except for black and red. The powdered dyes are made into a paste of sufficient body to adhere with fluid consistency to the needle, using water or Listerine as the menstruum. The needle arrangement is dipped into the desired color and the vibrating point traced about the stencilled design, the ink penetrating the skin only where it is punctured.

After the outline has been punched and the various artistic shadings, blendings or fillings performed, the area of operation is washed with a sponge containing 2 per cent Lysol solution, is wiped dry, and carbolated vaseline is rubbed in, over and around the site. This is lightly covered with strips of new English broadcloth or Kleenex attached to the skin by strips of gummed paper and the patient told to "keep it covered until tomorrow."

OBSERVATIONS

The investigation revealed:

(1) The razor employed for shaving is merely wiped dry after use on one patron and is considered ready for use on the next. No special procedure or attempt to sterilize the razor between customers is practiced.

(2) The celluloid stencil used for transferring the design is used over and over again without cleansing or sanitization. After use, the stencil is merely wiped with a dry cloth and placed in a cabinet or drawer where it is kept until its use is required on a new patron.

(3) Bacteriologic cultures were taken from needles by streaking them on human blood agar (5 per cent), and rinsing them into veal infusion and Brewer's thioglycollate broth. In all instances the cultures were sterile after seven days' incubation at 37.5 C.

(4) In the past, dyes have been reported³ to have been prepared with saliva, urine or water. Investigation revealed the dyes mixed in Listerine⁴ or water to be bacteriologically contaminated in the dry as well as in the suspended form. The addition of 1 per cent carbolic acid to the Listerine (by volume) rendered the dyes sterile and did not prove irritating upon application. The phenol acted as a skin anesthetic as well as a bactericide.

³ Shie, Marvin D. J.A.M.A. 10:94 Jan. 1928.

⁴ Listerine is used by the tattooers primarily because it possesses what they described as "a good clean antiseptic odor."

(5) It was also noted that after tattooing an area of approximately one square inch, the excess dye was wiped from the skin with a piece of cloth. Further observation revealed that this cloth was rarely changed. Cultures taken on this cloth showed it to be highly contaminated with bacteria. It was suggested that paper napkins be used for this operation or that the wiping cloth or paper be changed frequently.

SUMMARY

(1) An investigation of tattooing in Honolulu is presented.

(2) The methods employed by the tattooers are described in detail.

(3) Sterility tests were performed on tattooing apparatus, the instruments of which were found to be sterile. The dyes employed in tattooing were found to be bacteriologically contaminated in all cases. Preparation of the dyes in Listerine containing 1 per cent phenol proved to be adequate to control sepsis.

(4) From this investigation it was noted that there are inadequate regulations for controlling sources of infection as a result of the procedure itself.

(5) To further control and curtail the chances of infection from tattooing, the use of an individual towel for each patron in wiping the skin has been suggested.

CONCLUSIONS

(1) The number of reports of infections due to tattooing are small, primarily because proper methods for reporting such occurrences do not exist. It is felt that such complaints should be reported and investigated as a public health procedure, and that there is a definite need for establishing regulatory procedures for the tattooing profession if it is permitted to flourish.

(2) The methods now employed by the tattoo artists in Honolulu appear to be aseptic and are accompanied by sufficient precautionary measures to reduce secondary infection.

ACKNOWLEDGMENT

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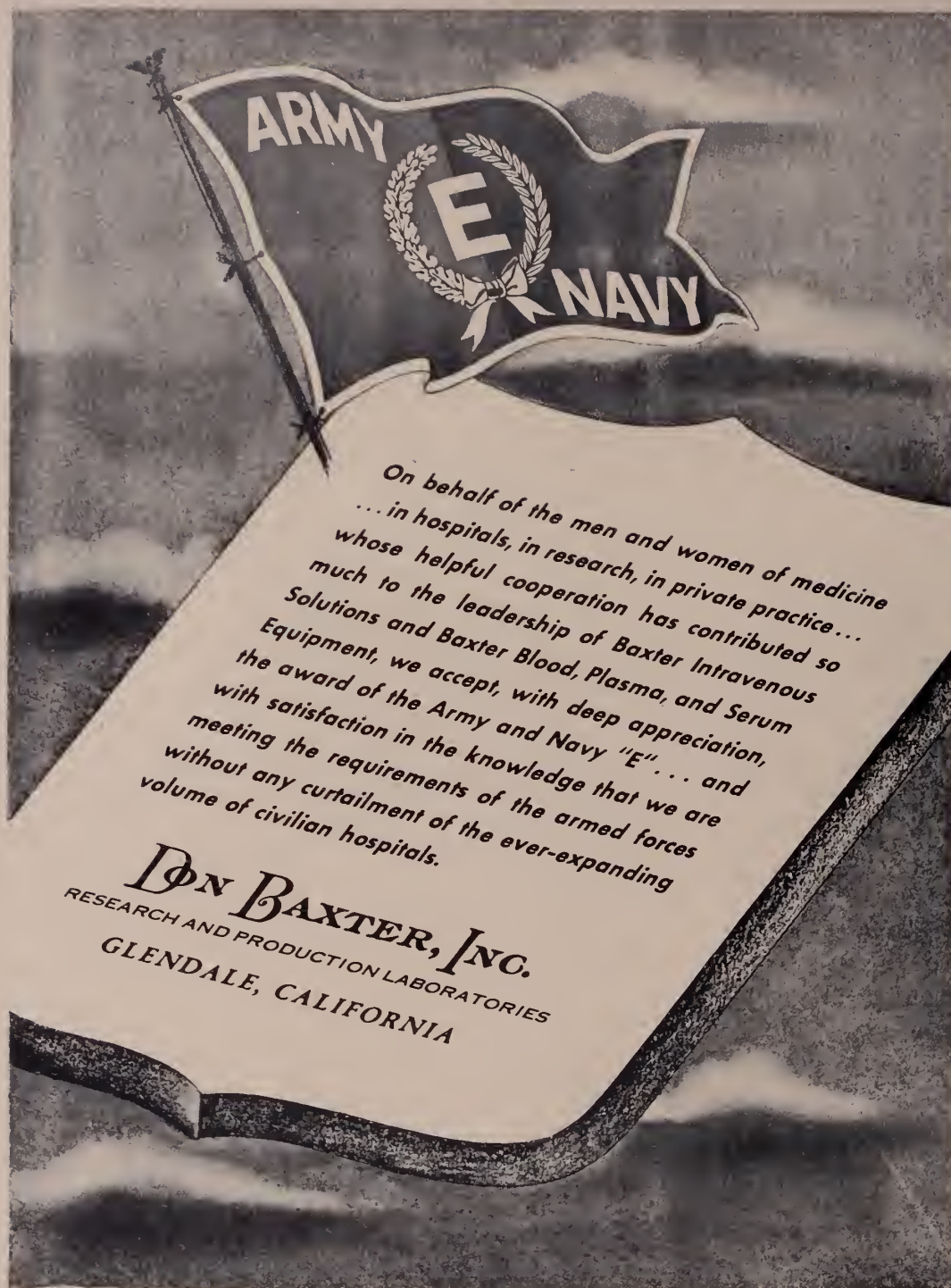


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EDITORIALS

POLITICS IN HEALTH: II

Dr. Richard K. C. Lee, who has been Deputy Commissioner of Public Health in the Territory since July 1937, accepted on July 9, 1943, the newly created position of Director of Public Health.

Dr. Lee is an alumnus of McKinley High School, Honolulu, and of the University of Hawaii. He is a graduate of Tulane Medical School in the class of 1933, and he received the degree of Doctor of Public Health from Yale University in 1938.

Dr. Lee is the only physician in the Territory who could have qualified for the position of Commissioner of Public Health under the recently and regrettably repealed law which fixed the educational and experience qualifications for the top position in Hawaii's public health organization.

Since his association with the Territorial Board of Health he has at various times served as Acting Director of the Bureaus of Maternal and Child Health, Communicable Diseases, and Tuberculosis. He has served as Acting Territorial Commissioner of Public Health on many occasions, for over a year all told. He has lectured on public health administration at the University of Hawaii annually since 1937. He is a member of the American Public Health Association and holds a reserve commission in the United States Public Health Service.

Dr. Charles L. Wilbar, Jr., became President and Executive Officer of the Hawaii Territorial Board of Health on June 25, 1943 by gubernatorial appointment, following release from the Army.

A graduate of the University of Pennsylvania Medical School in the class of 1932, Dr. Wilbar served a year's internship in Philadelphia, followed by a year's residency there in pediatrics, and a residency in medicine at The Queen's Hospital, Honolulu. Following this he spent five years in the investigation and supervision of child health—three in charge of the Ewa Health project and two as Director of the Bureau of Maternal and Child Health

of the Territorial Board of Health. He then had a year's postgraduate training in pediatrics at Cincinnati, during which he was on leave of absence from his position with the Bureau of Maternal and Child Health. On December 13, 1941, six months after his return to Hawaii, he was called into active duty with the Army, at first as Captain and later as Major. Eight of his eighteen months of Army service were spent as County Health Officer for the County of Maui.

The above biographical sketches offer reasonable evidence that Dr. Wilbar has had training and experience which should qualify him well as a pediatrician; that Dr. Lee has had training and experience which should qualify him well as a public health administrator.

That they are both estimable young men of ability and character all who know them will attest.

The law which guaranteed to the people of Hawaii that the head of their Board of Health should be a man of superior education and attainments in the public health field was killed by the 1943 Legislature for reasons which have never been made clear.

But that the members of the newly appointed Board of Health recognized the importance of and necessity for specialized training and experience, was clearly indicated by their creation of the position of Director of Public Health and their appointment of Dr. Lee to this position at a salary commensurate with the importance and responsibilities of the post.

Dr. Wilbar is responsible to the Governor of the Territory, who appointed him.

Dr. Lee is responsible to the Board of Health, which appointed him.

Whether an organizational set-up with two heads and divided responsibility aimed in two directions as indicated will work for the good of the people of the Territory remains to be seen.

It seems difficult to believe that any one would have planned it that way.

OPHTHALMOLOGIC FEE-SPLITTING

Fee-splitting—the practice whereby a surgeon refunds a portion of his fee to the physician who referred him the case—is an unethical and dishonorable procedure. Few physicians indulge in it, and no physicians openly approve of it or acknowledge it. It is regarded as an unfair and dishonest means of extracting an unnecessarily large fee from the patient—the proper charge for services rendered, plus a “tip,” so to speak. It goes without saying that the practice of splitting fees dishonors the man who receives the “tip” as much as him who gives it. Both ends of the stick are dirty.

Yet this reprehensible system continues to exist and flourish, in a thinly disguised form, among many physicians who do not—for some reason—regard themselves as unethical by reason of their participation in it. The “tip” is a fixed portion—usually 20 to 40 per cent—of the price of a pair of glasses; it is collected from the patient by the optician, and paid by him to the ophthalmologist who performs the refraction. Only the optician and the doctor know about this aspect of the transaction; presumably both realize that *the patient wouldn't like it*. He might consider that it was unfair for them to pretend that this “tip” was part of the price of the glasses; he might even feel that it was in the nature of a bribe paid to the physician to induce him to send more patients to that particular optician to have glasses made.

Physicians who participate in this share-the-profits plan attempt in various ways to justify themselves. A frequent defense runs about as follows: a doctor is entitled to sell glasses to the patient at a reasonable profit, just as he is entitled to sell the patient medicine at a reasonable profit; the fact that an optical company is willing to undertake the work of selling them, and still turn part of the profit over to the doctor, makes no difference in the propriety of the doctor's pocketing the profit in question. Like all similar arguments, this is subject to a simple criterion of validity: *is the ophthalmologist being paid this profit for services rendered to the patient?* Clearly, the answer is no. He is being paid it for services rendered to the optician—for sending the patient to that particular optician to have the glasses made. It is just a split fee—a bribe—and the patient is the one who suffers by it.

This deplorable system serves no purpose except the dubious one of secretly increasing a physician's income a little. It is not necessary in any sense of the word. It stands condemned out of the mouths of the ophthalmologists themselves, by the following resolutions adopted in Chicago in 1924:

RESOLVED, That it is the sense of the Section on Ophthalmology of the American Medical Association that we deprecate the selling of glasses by the ophthalmologist to his patients in communities where the services of reliable dispensing opticians are obtainable, and

RESOLVED, That the acceptance of commissions or considerations, either directly or indirectly, from the opticians and optical houses, from the sale of glasses, is *absolutely contrary to all our standards of medical ethics and is just as reprehensible as the splitting of fees*.

The persistence of the system among certain Honolulu eye specialists in particular stands condemned by the decision of the Committee on Forms of Medical Practice of the Honolulu County Medical Society, which in 1932 affirmed the above resolution in their published report of that year.

It may be partly as a result of this resolution that a few ophthalmologists no longer participate in this unethical practice. There are enough such men to permit a few—a very few—conscientious opticians to follow suit. It is on these that the heavy burden falls; they pay the price of lessened business for their honesty, because so many ophthalmologists will send their patients only to the optician who pays—or bribes—them to do so.

The job of cleaning up this situation falls squarely on the shoulders of the medical profession in general and the ophthalmologists in particular; all they need do is to refuse to accept the proffered bribe. The optician will then no longer need to make the extra charge to the patient, and the whole system will collapse. The issue is perfectly clear; it remains only to be seen whether it will be met.

ARMY-NAVY “E” AWARD TO DON BAXTER, INC.

Don Baxter, Inc., recently received the Army-Navy “E” Award for great accomplishment in the production of intravenous solution and blood plasma equipment for the Armed Forces.

Colonel Robert Skelton (MC), Commanding Officer of the San Francisco Army Medical Depot, made the Award Presentation Address. Commander Corydon M. Wassell, (MC) USNR, addressed the audience and presented the “E” lapel pins to the employees.

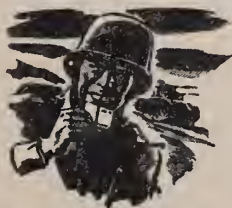
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PROGRESS IN INTERNAL MEDICINE

DENGUE FEVER

Dengue fever, quiescent since 1912 in Hawaii, has suddenly made its appearance in Honolulu in the last few weeks. Physicians mention having seen a typical case from time to time in the past thirty years, but there were no cases reported officially.

Name

Dengue fever is well known by many synonyms, most of which describe the prominent symptoms, as for instance *broken heart*, *broken wing*, *seven-day fever*, and, more commonly to us, *breakbone fever*¹. Locally and very characteristically in times past it has been called *boo-boo fever*, because of the emotional depression which is so frequently encountered as to be almost pathognomonic.

Actually there is some speculation as to the origin of the name *dengue*. I prefer the generally accepted theory that *dengue* is a corruption of the Spanish word *danguero* as used by the natives of St. Thomas in the Virgin Islands, where I first saw dengue fever. There they referred to one afflicted with a bad back-ache, who tended to walk on the balls of the feet, as a Spanish dandy or *danguero*.

Epidemiology

Dengue was first observed by Boylon in Java in 1799². It appears to occur throughout the tropical and subtropical countries of the world in endemic or epidemic form, in fact, wherever the *Aedes aegypti* or *Aedes albopictus* mosquitoes exist, so that in the past epidemics have spread up into North America. Manson³ states that about every twenty years one can expect an epidemic or pandemic of dengue. As the records are reviewed, this statement in general appears to be fairly true, with gradually lengthening intervals. Here in Hawaii we have gone half again as long between epidemics.

Perhaps some of the best work on mosquito transmission was done by Siler⁴ in 1926 in the Philippines, when he demonstrated that a mosquito biting a patient in the late incubative stage, within a few hours before the onset of fever, or during the first three days of the illness, could become infected. In turn, the mosquito would be infective after eight to eleven days and remain so for the rest of its life—up to about ninety days. *Culex fatigans* may transmit the virus mechanically, but this mechanism is so inefficient as to be of but slight practical importance.

Simmons⁵ experimentally worked out the incubation period of dengue fever on newly arrived troop volunteers in the Philippines. He found this to be from three to thirteen days, the average in approximately 80 cases being five and six-tenths days. He found, in 1928 and again in 1931, that monkeys in the endemic areas could not be infected, whereas those obtained from elevations above 4,000 feet, or other areas where dengue did not exist, were found to be susceptible. This seems to correspond fairly well with the human immunity. Certainly there are those who appear to have recurrent attacks of dengue in diminishing severity. However, in an endemic area usually the newcomers become afflicted. Six or seven years ago in the Virgin Islands newcomers were warned that they could expect to come down with dengue fever in the first several weeks after arrival, and usually did, but no one thought much about the matter. Nevertheless, it was rare to see a case among the native population.

Clinical Aspects

Anyone who has had typical dengue fever cannot mistake it. The patient does not merely suffer from the malaise of influenza or a cold, nor the pain of any localized neuritis or myositis. Typically, the onset is acute, and in a few hours the full symptoms have developed, although the fever may not reach its maximum height for twenty-four hours. Sudden pain of the ocular muscles with any movement of the eyeballs is often the prodromal symptom, followed by aching of all the large muscles, markedly aggravated by any motion which tends to stretch them. Thus the name *breakbone fever*; or the comparison of the gait of one so afflicted to a dandy because he seems to walk mincingly or on tiptoe, with his legs partly flexed and his torso bent slightly forward in an attempt to avoid an undue stretching of the muscles.

The mental depression accompanying the disease is a fairly constant finding and is probably due to the continued aches and pains, which frustrate mind and soul. Unlike those of influenza, colds and other minor ailments, these aches and pains are alleviated very little by the salicylates.

The temperature in dengue is often a saddleback curve, usually rising within twenty-four hours to a maximum of 103-104 F., tapering off gradually in three or four days, frequently to rise again to about 102 F. Following this, there is often a rapid drop to normal and a rapid recovery.

The terminal rash, which is usually macular, somewhat resembles that of German measles. It is not of much diagnostic help except in retrospect for it occurs most frequently after the termination of the fever when the patient is clinically well. In the West Indies I have observed the rash in patients several days after complete clinical recovery. Most typical is the rash which involves the palms and soles with rather marked pruritus and desquamation after several days. The severity of the rash and even its appearance is quite variable, however, though some rash occurs in about 80 per cent of cases. Often the rash is only a mottling of the skin with some pruritus of the hands and feet.

Convalescence is often short and the symptoms usually disappear almost as rapidly as they appeared; prolonged asthenia and debility, so characteristic of some epidemics, has not been a feature of the current Honolulu flareup.

There is little aid to be obtained from the laboratory, the leucocyte count being the only help. There is usually a leucopenia, often as low as 2,000, by the third day. Some texts mention the appearance of a relative lymphocytosis, but in my experience it has not been observed very often. The initial leucocyte counts are very frequently well within normal range; a leucocytosis would probably suggest some other or concurrent disease.

Were it not for the more serious implications of a dengue epidemic, it might even be desirable to have one, thus affording the service personnel an opportunity to develop at least partial immunity to the

disease here in Hawaii under more favorable conditions for coping with the illness than would be the case at a South Pacific battle front.


Jarcho⁶, however, in the May, 1943 issue of "War Medicine," points out that dengue fever is transmitted chiefly by the same mosquito which transmits yellow fever, so that a community wherein dengue can develop is also able to support an epidemic of yellow fever. A campaign to eliminate the *Aedes aegypti*, therefore, not only is desirable for the purpose of reducing the incidence of such a temporary ailment and ridding the community of a few more annoying mosquitoes, but it is to be heartily recommended in order to decrease the possibility of so serious a public health hazard as yellow fever.

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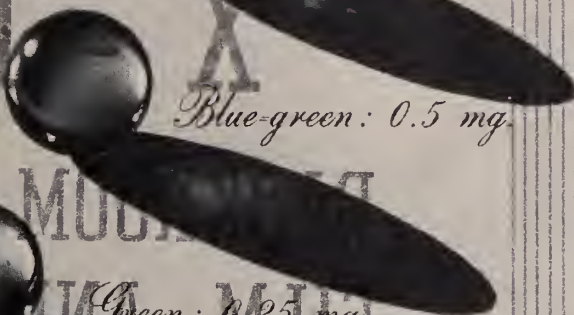
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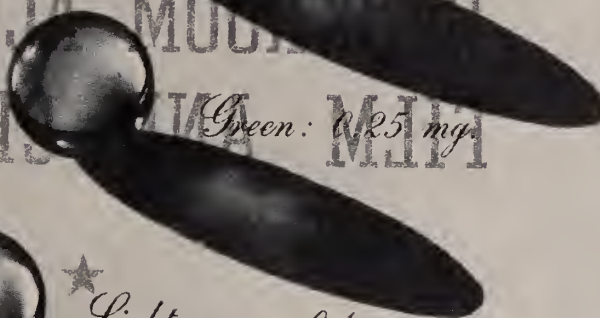
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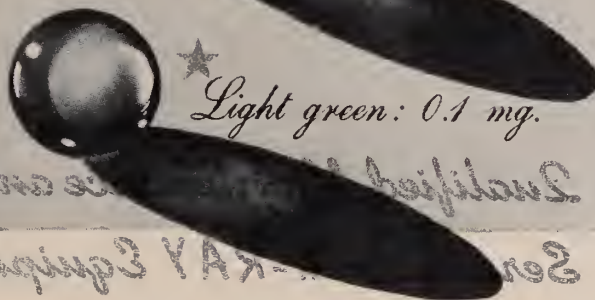
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FIVE-YEAR CURE OF CARCINOMA OF STOMACH WITH REGIONAL METASTASES

About six and a half years ago an eccentric old man of good means came to my office with a series of roentgenograms of his stomach taken at monthly intervals over a period of approximately a year. He had already gone to a number of good surgeons and wanted another opinion before subjecting himself to operation. The roentgenograms showed unequivocal evidence of gastric carcinoma. A month later he returned, and after a thorough check-up a subtotal gastrectomy was done.

Almost five years later, after a fairly active and comfortable life, he succumbed to self-inflicted barbiturate poisoning. Necropsy showed no evidence of carcinoma anywhere.

Report Of Case

History:—T. K., a Japanese man, aged 61 years, was first seen on February 7, 1937, with epigastric discomfort of approximately eighteen months' duration. His family history was of no significance. A chronic alcoholic for many years, he had been treated for gonorrhea, off and on, for thirty years. Within the past four years he had been subjected to four abdominal operations, the first for the removal of a chronically inflamed appendix and the second for a complicating peritonitis which required drainage. Incisional hernia developed at the drainage site and two unsuccessful attempts to repair the defect were made by the same surgeon. When in September 1935 he began to experience anorexia and vague epigastric discomfort, particularly after meals, his physician attributed the symptoms to the incisional hernia. By May 1936 the symptoms were worse and were accompanied by a feeling of fullness after small meals. For about three months there had also been vague epigastric pain, particularly after ingestion of solid food, and he had been forced to take soft food in small amounts with a consequent loss of weight. From May 1936 to February 1937, gastric roentgenograms were taken every two months.

Laboratory Examinations: Erythrocytes, 3,620,000, with 80 per cent hemoglobin; normal leucocyte count. Negative Wasserman and Kahn. Urine normal. Gastric analysis showed achylia and traces of lactic acid and occult blood.

X-ray Studies:—Roentgenograms of the stomach were taken in May, July, September and November of 1936 and in February and March of 1937. The filling defect on the first plate was seen in the lesser curvature just above the pylorus and extended upwards for a distance of about 1½ inches; on the last plate, which was taken after the administration of atropine, a considerable defect was seen in the pyloric region involving the lesser as well as the greater curvatures. The progressive nature of the growth is well illustrated in the roentgenograms.

Follow-up series of gastric roentgenograms, taken postoperatively at three months, two and a half years, and three years and eight months, showed the remaining stomach progressively increasing, mainly in the long axis, by a total of 2 inches in the last films. Regurgitation into the proximal segment was not seen in any of the plates.

Operation:—(March 31, 1937) Under avertin (80 mgm) supplemented with gas and ether, the peritoneal cavity was opened through a high left rectus incision. Many dense peritoneal adhesions, the result of previous peritonitis, were encountered. The growth was located in the lower segment of the stomach. The liver was enlarged, but there was no gross evidence of metastases to it, or to the rectal shelf or general peritoneal cavity, except the subpyloric lymph nodes, some of which were enlarged, hard, and white and gritty upon being cut. Nodes along the lesser curvature were enlarged but no gross evidence of metastases was found in them. After detaching the omentum from the transverse colon, the duodenum and stomach were mobilized with some difficulty because of adhesions. Block dissections of the regional lymph nodes were carefully done in the gastro-colic and hepato-gastric regions. The hepato-gastric ligament was divided close to the liver. The duodenum was clamped and divided about 2 inches from the pylorus, and the stomach was excised, removing about nine-tenths of the lesser curvature and about two-thirds of the greater curvature, well beyond the visible growing edge of the tumor. End-to-side gastrojejunostomy was performed, utilizing the entire gastric opening, through the post-colic route. The transverse mesocolon was so thickened and shortened that no attempt was made to suture it to the gastric stump. Immediate post-operative condition was good.

Pathologist's Report:—"Pyloric portion of stomach measures 9 cm. along the lesser curvature and 12.5 cm. on the greater curvature. Approximately 2.5 cm. of the duodenum is attacked. There is omentum with the specimen. All along the greater curvature there are enlarged lymph nodes, the largest of which measures 1.2 x 1.6 x 1 cm. Some of these lymph nodes have been converted into carcinomatous masses. The specimen has already been opened. Along the lesser curvature there is a large ulcer, 6 x 4 cm. Its edges are very redundant. The base of the ulcer is very nodular and is covered with grayish necrotic exudate. Its serosal aspect is hemorrhagic and nodular so that the malignancy has reached this surface. The surrounding gastric mucosa is injected and covered with purulent mucoid exudate.

Microscopic Diagnosis:—Infiltrating adenocarcinoma of the stomach with metastases to the lymph nodes."

Progress:—The post-operative course was smooth for two weeks; the wound healed per primum and the patient was up and about on the fourteenth day. Two days later, after a hot bath and a stroll in the hospital grounds against his nurse's advice, he con-

tracted an acute upper respiratory infection which resulted in pneumonia. Recovering from this condition, he remained well, enjoying fairly normal meals and activity managing and directing a manufacturing plant until the end of March, 1942.

On this date, the patient terminated his life by taking barbiturates. Autopsy showed on evidence of recurrence, grossly or microscopically.

Nature's effort to compensate for the lost stomach after an end-to-side anastomosis of the jejunum to the stump of the stomach was demonstrated in the follow-up roentgenograms which showed an increase in size, chiefly by elongation. To a lesser extent this compensatory change was noted in the necropsy specimen. About 5 inches of the jejunum distal to the stomach had undergone a spindle-shaped enlargement to take up part of the lost function of the stomach. Above the stomach the jejunum and duodenum were of normal size and appearance. The stomach were definitely narrowed, particularly at the lesser curvature, preventing regurgitation of the stomach contents into the upper segment and preventing to rapid emptying into the lower segment of bowel. The mucosa of the stomach presented a few hypertrophic rugae running toward a smooth low ridge representing the boundary line between the stomach and jejunal walls. The latter showed its usual rugae except that they appeared atrophic.

Discussion

Carcinoma of the stomach is a curable disease provided it is recognized and can be removed by wide excision. In the case described the tumor was permitted to grow for almost a year before removal and the excision was done when there was already extension to regional lymph nodes and the serosal surface of the stomach. Five years later, however, there was at necropsy no sign of either local or distant recurrence.

Early recognition and complete removal of the growth are the aims of surgical treatment for carcinoma anywhere. In 1895 Halsted set the mark for surgeons to strive for in the surgical treatment of breast carcinoma. The principles Halsted taught and Finney practiced regarding carcinoma surgery should be thoroughly understood and practiced, if reasonably good results are to be obtained in the surgical cure of cancer of stomach. It is not sufficient to have a patient living for two or three years after partial or total extirpation of the stomach for carcinoma; the percentage of five years cures at best is about 39.5 per cent (Gatewood) for all types, and 20 per cent for those with regional lymphatic metastases. Finsterer, Balfour, and Walton record similar figures.

Probably it is unfortunate, although true, that surgeons frequently attack carcinoma of the stomach in a confused state of mind. It is not sufficient to remove the diseased portion of the stomach: the growth must be removed as widely as possible in the best manner—thoroughly, neatly, and with dispatch.

Carcinoma of the stomach must be respected as much as if not more than carcinoma of the breast. The growths in the stomach, unlike those in the breast, are closer to the regional lymph nodes, thinly

barricaded by fat and not at all by muscles and fascial tissues. The mucosal and serosal surfaces are possible fields for implantation, the former during sectioning and suturing and the latter at any time, for a cancer cell grows easily on raw as well as peritoneal surfaces. The growth should be removed, therefore, with the widest margin possible, not piece-meal but in toto, without manipulation or squeezing of the cancer cells during the process of removal. Mauling and unnecessary dull dissections frequently lead to bleeding and possible spilling of cancer cells over the peritoneum. The great omentum is detached from the transverse colon.

Beginning the dissection in an area away from the growth, as advocated by Sir Hugh Devine, is proper; whether the growth is located at the fundic or at the pyloric end, it is logical to start the operation at the opposite end. At least 2.5 cm. of the unstretched duodenum should be removed if the growth is located in the pyloric end of the stomach. Nineteen-tenths of the lesser curvature of the stomach is almost always sacrificed. The loose areolar tissues, particularly in the hepato-duodenal and pyloro-duodeno-colic regions where the supra-duodenal, supra-pyloric and the subpyloric nodes are located, should be carefully dissected out en masse with the duodenum and pylorus, and particular care should be taken not to lacerate them in the process, since they are the most common sites for local metastases. The wider the excision without spilling, the better the chance of cure.

The detachment of the great omentum from the transverse colon after the manner of Hey Groves (1910) is practiced by the majority of surgeons today. Collapsing of the stomach, as advised by Devine, and mobilization of the duodenum, at times helps in the wide excision of the carcinomatous tissues. Preliminary washing of the stomach by means of the Levine tube; feeding of sterile liquids as advised by Finney, and the oral administration of sulfasuxidine or sulfaguanidine pre-and postoperatively, help to keep down the gastrointestinal flora and aid a smoother postoperative course. The writer no longer practices the routine passing of a nasal tube through the anastomotic stoma, reserving its use for those cases in which technical difficulty is encountered in the mobilization of the carcinomatous organ, which makes hemostasis and cleanliness uncertain and imperfect. Such instances are only rarely encountered. Patients are more comfortable without the tube and when oral liquids are restricted for one or two days, distention does not follow since very little air is swallowed.

Summary

A case of apparent five-year cure of adenocarcinoma of the stomach by surgery, confirmed at autopsy, is reported, and the technical aspects of gastrectomy for carcinoma are discussed.

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CLINICO-PATHOLOGIC COMMENT

NOTES ON A JOURNEY

On my recent trip to the mainland to take the "Boards," I visited laboratories in New York, Cleveland and Chicago.

While in New York City I had the pleasure of meeting Dr. Abner I. Weisman and observed his technique of injecting frogs with urine for a new pregnancy test. New?—almost ten years old now. Dr. Weisman has perfected this frog test with modifications to such a point that he now feels it is superior to the Friedman test. In over 600 cases he has not had a single false positive. There were two false negatives but these were with urines collected too early in pregnancy; one week later they were both positive. The test is very simple and the results are obtained in from six to eighteen hours. The animal is the female (of course) African clawed frog, more formally known as the *Xenopus laevis* Daudin. Urine is concentrated with acetone and injected into the dorsal lymph sac. This latter process is a little tricky as is the handling of the slippery frog. If the urine is positive, the frog deposits her eggs. These are readily recognized. A small quantity of these frogs have recently arrived and the technique is being checked.

In New York, too, I examined, thru the courtesy of Drs. Jaffe and Lichtenstein, their microscopic preparations of bone tumors. The better part of an afternoon was spent on material these two men had collected and studied for several years. I would have liked a month. Most institutions do not have an adequate quantity of bone pathology so that this opportunity was welcomed.

In Cleveland I visited my former chief Dr. B. S. Kline and his assistant, Dr. Anna Mae Young, and also saw Dr. Harry Goldblatt at Western Reserve University. In his final address as President of the American Society of Clinical Pathology, Dr. Gold-

blatt expounded on the sad fact that experimental medicine is being woefully neglected by those whose primary job it is to conduct investigative work, namely the pathologists. There are too many case reports and case collections. Doctors are too prone to beg off with the lack of space and material as an excuse.

Dr. Goldblatt selected one year of publications in the *Journal of the American Society of Clinical Pathologists* and analyzed these papers with respect to content. Out of 445 papers which were published by 329 members only 28 were of an experimental nature. These were published by 18 authors. There was a total membership of 746. Indeed, the pathologist is lying down on the job.

In Chicago at the meeting of the American Society of Clinical Pathology there was an excellent symposium on cirrhosis of the liver. The material presented was considerable and will form the subject for a future column. There were also fine talks on the pathology of trichinosis by Dr. S. E. Gould of Eloise, Michigan, and on plasma transfusions in medical cases by the well-known Dr. Max M. Strumia, who was given the Ward Burdick award by the Society for outstanding research.

There were several exhibits; the best attended was that of the Rh factor by Dr. Davidsohn—and as a result he was the hardest working man present.

I had an opportunity to see there the Techniscope. This instrument permits ten persons to look at one slide simultaneously just as though they were looking through individual microscopes. This instrument can also be used for projection and photography.

On the last day of the meeting a fine seminar on tumors of the central nervous system was conducted by Dr. Percival Bailey.

LOUIS HIRSCH, M. D.

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The alarming rise in the incidence of peptic ulcer during the past decade in the United States and Europe, has led to a highly organized effort by physicians in diagnosing and treating gastro-intestinal disorders.

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The film was unanimously approved by the "Committee on Medical Motion Pictures of the American College of Surgeons." It contains no advertising matter of any kind.

[There is 1500 feet of 16 mm. full-color film with sound track. Running time: 45 minutes. The full expense of exhibition will be borne by John Wyeth & Brother, Inc.]

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HOSPITAL NEEDS

Whose responsibility is it that Honolulu's hospital situation is in such a dangerous position? With a shortage of over 600 beds, according to accepted standards, what would happen if an epidemic hit us? With the outbreak of dengue is raised the spectre of other epidemic diseases easily carried in on the ships and planes returning from infested places south and west of Hawaii.

Upon the plea of the obstetricians, members of the society met with trustees of Queen's, Kapiolani, St. Francis, Children's and Kuakini Hospitals—all were agreed as to the need and the urgency of securing beds without delay.

Letters were addressed to the Board of Health, the Hospital Association and the Public Health Committee of the Chamber of Commerce, and are quoted here.

If every individual doctor will acquaint himself with the facts as given, and use every influence at his command, perhaps results will be forthcoming now—rather than a year from now.

July 21, 1943

The President
Board of Health
Honolulu, Hawaii

Dear Sir:

The enclosed report is submitted to you for study and, if you are impressed with its urgency, for your endorsement.

Recommendations were made by us in December of 1941 to the Board of Health for expansion of hospital facilities, and the Society has constantly appealed to the O.C.D. and the military authorities since that time (witness our letter to the Board of Health dated December 4th and editorial in January 1942 issue of the the Hawaii Medical Journal, copies of which are attached). The matter has now again been forcefully brought to our attention by the obstetricians, an overworked and serious group of men who, more than any one else, have been constantly harrassed by the lack of beds and facilities in coping with the city's accelerated number of births.

We feel the time is right to gather the endorsement of the various agencies interested in the community's health and ask their aid in presenting this problem to the community and the authorities in such a way as to receive action.

Yours very truly,

N. M. Benyas, M. D., President
Honolulu County Medical Society

CIVILIAN HOSPITAL BED SHORTAGE

Time and time again the doctors, singly and as a group, and the hospitals, have drawn attention to the overcrowding of our civilian hospitals and have asked that something be done.

Hospitals have gone out to the public in drives for funds to augment their facilities or have applied and were granted funds under the Lanham Act the latter part of 1941.

FUNDS AVAILABLE

Queen's Hospital	\$250,000	
St. Francis	569,000	
Kapiolani	318,000	
Children's	250,000)	Pvt. funds
	125,000)	Lanham

With the advent of the war, however, and under military control, none of the civilian hospitals was permitted to carry out its building program under the Lanham grants, nor permitted to add even temporary structures to meet a load that became even greater than visualized in 1941. Only the facilities at Sacred Hearts, Wahiawa and the Polio Hospital have been added meanwhile; the Polio Hospital is for special services only, the Wahiawa Hospital in no way alleviates the load in Honolulu, and Sacred Hearts can be expected to be turned back for school purposes as soon as the war emergency is considered over or the OCD program curtailed.

Without considering future needs (which matter should likewise be given careful planning) our hospitals and doctors have been seriously handicapped for the past few years by the lack of hospital facilities, and today they feel the situation is actually dangerous. An epidemic of any proportion might be disastrous.

Either the funds, and the material and labor, should be released so that hospitals may carry out their building programs under the Lanham grants, or local means and material should be found to permit the hospitals to erect temporary structures to tide them over to the time when permanent construction is possible.

In a meeting recently held with hospital representatives, an estimate of additional beds required immediately showed:

St. Francis	100
Queen's	100
Children's	25
Kapiolani	50

Since no permanent programs could be carried out in less than one year or eighteen months, it has been urged by many that temporary structures be erected at once even though definite plans for permanent buildings have been adopted.

To substantiate the need, some standards, statistics and reports are offered for study:

Standards universally accepted for gauging adequacy of hospital facilities in a community are:

- a) A ratio of 5 general hospital beds per 1,000 population, and in addition:
 - .5 per 1,000 for contagious diseases
 - .5 per 1,000 for diseases of children
 - .45 per 1,000 for maternity.
- b) Occupancy averaging over 85% of capacity for any considerable period is considered overcrowding.

On the basis of figures given below, our ratio of beds to population in 1941, for the City of Honolulu, was 3.35 and today it is 3.31; and on this basis a shortage of 620 beds was indicated in 1941 and 694 today. This is aside from any beds or facilities that should be held in readiness against emergency due to war.

	1930	1937	1940	1941	1943
Population (Thousands)	138	147	180	200	219 (est)
Average number of general beds for urban population, 5 per 1000	692	735	905	1,000	1,095
Additional:					
.5 per 1000 cont. dis.	69	73	90	100	109
.5 per 1000 dis. child.	69	73	90	100	109
.45 per 1000 maternity	62	66	81	90	98
TOTAL	892	947	1,166	1,290	1,411

Bed Capacity:			
Children's	—	76	75
Japanese	120	174	153
Kapiolani	44	51	50
Queens	247	274	300
St. Francis	51	67	111
Shriners	28	28	28
TOTAL	490	670	717

Occupancy:			
Children's	—	100%	100%
Japanese	63%	101%	84%
Kapiolani	80%	120%	125%
Queen's	80%	100%	93%
St. Francis	95%	100%	100%
Shriners	100%	100%	100%

On the 85% occupancy basis, therefore, as indicated above, our hospitals were already dangerously overloaded in 1941.

In November 1941, Dr. Haralson, then Commissioner of Public Health, in substantiating his recommendation for approval of applications made by civilian hospitals for grants under the Lanham bill, covered the ground very thoroughly, and we quote here from his communications:

"A survey of hospital facilities of the community reveals an urgent need for additional beds. After visiting all of the hospitals, discussing needs with the several superintendents, obtaining information and assistance from local physicians, and conferring with a committee appointed for that purpose by the Board of Governors of the Honolulu County Medical Society, I have reached the conclusion that there is need for an additional 250 hospital beds in the City of Honolulu to meet the present emergency.

"Except for the personnel actually constituting the military forces, who are cared for in service hospitals, all personnel connected with the national defense program and members of their families must seek hospital care in civilian hospitals. Exclusive of hospitals for the insane, for tuberculosis and for the care of lepers, hospital services for the Island of Oahu are provided in 15 hospitals varying in size from 6 beds to 284, as follows:

HONOLULU Private	Type	Registered with A.M.A.	Normal Capacity
Japanese	General	yes	168
Kapiolani Maternity	Gyn. & Obs.	yes	50
Children's	Children	yes	75
Queen's	General	yes*	284
St. Francis	General	yes	65
Shriners	Orthopedic	yes*	28

TOTAL 670

RURAL OAHU

Plantation			
Ewa	General	yes	46
Aiea	"	yes	45
Kahuku	"	yes*	32
Waipahu	"	yes	60
Waialua	"	yes	40

Private			
Mack	"	yes	9
Tamura	"	yes	7
Uesato	"	no	6
Uyehara	"	no	15

TOTAL 260

GRAND TOTAL..... 930

* Approved by the American College of Surgeons as meeting unconditionally their minimum standards.

"The foregoing table shows that 6 hospitals with a normal capacity of 670 beds are located in the City of Honolulu and 9 with a capacity of 260 beds are in the rural areas. Five of the rural hospitals with a total of 223 beds are owned and operated by plantations and serve plantation employees. The total capacity of the other 4 rural hospitals, 3 of which are in the village of Waipahu, is only 37 beds. For purposes of serving needs created by the national defense program, the rural hospitals may be disregarded.

"Consequently the demand for additional hospital service falls upon hospitals located in the City of Honolulu. Three of these hospitals, Queens, St. Francis and Kapiolani, bear the brunt of this load and for months past have been operating at more than 100% capacity. The Japanese Hospital with a capacity of 168 beds has also been operating at near capacity. I believe, however, this situation has existed for some time and the national defense program has not added an appreciable increase in the load. The Shriners' Hospital is a small institution limited to the care of orthopedic patients. It has operated at capacity for a number of years. Services at the Children's Hospital, with a normal capacity of 75 beds, including an isolation unit of 15 beds, have been materially increased since the advent of the national defense program. Only within recent weeks, however, has the institution been operating at full capacity.

TOTAL ADMISSIONS, HOSPITAL DAYS AND BIRTHS, QUEEN'S, ST. FRANCIS, KAPIOLANI AND CHILDREN'S HOSPITALS BY YEARS

Year	Total Admissions	Hospital days	Births
1937	*12,435	** 93,360	1,745
1938	15,492	***124,780	2,083
1939	16,593	141,795	2,595
1940	18,666	157,535	2,986
1941 (10 mos.)	17,043	153,700	2,980

* does not include Children's Hospital

** does not include Children's and St. Francis

*** does not include St. Francis

† No births at Children's.

(Detailed information by hospitals for these years is cited in Dr. Haralson's original report).

"The foregoing tables indicate, without question, that the need for additional hospital facilities is urgent. During the period 1937 to the present there has been very little new construction. Facilities in some instances have been remodeled, which provided additional space, most of which, however, was reflected in increased facilities for maternity cases."

For a comprehensive study of the general hospital bed shortage, and the maternity facilities in particular, we recommend the "Survey to Determine Needs of Maternity Hospital Beds in the City of Honolulu and Rural Oahu 1931 to 1941" compiled by Dr. O. Lee Schattenburg, Associate Director Bureau of Maternal & Child Health, Board of Health.

If and when this immediate need is cared for, the community is still faced with the problem of future hospital planning.

As each hospital went to the public for funds in the past, and as one separately applied for funds under the Lanham Act, also as each one now will make additions to meet the immediate problem, the need

becomes apparent to consider the total hospital picture for the city rather than isolated unit expansion. In being called upon to review the drawings under consideration by Queen's Hospital for expansion of its maternity facilities, our obstetricians were impressed by the piece-meal and patchy approach to the problem and felt that any new maternity building for the community should be part of a coordinated hospital building program.

Other questions arise:

1. What is the total number of additional hospital beds which this community should have?
2. How many of these beds should be
 - a. general beds
 1. surgical
 2. medical
 - b. children's beds
 - c. obstetrical
 - d. special
 1. tuberculosis
 2. crippled children
 3. mental
 4. convalescent and chronic invalids
3. For the greatest benefit of the community, how should these beds be distributed among the existing hospitals?

Some group in the community should be charged with the responsibility of studying the complete picture and outlining a program for the future.

In summary, there seem to be two phases to this problem:

1. To provide immediately additional beds to relieve a situation which is acute and dangerous.
2. To draw up a program of hospital expansion to fit the needs of the community.



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EMERGENCY MEDICAL SERVICES

(FORMERLY MEDICAL PREPAREDNESS)

REPORT FOR FISCAL YEAR ENDING JUNE 30, 1943

Introduction—The Emergency Medical Service has successfully carried out the program of civilian medical protection outlined in the letter to the Director of Civilian Defense from the Military Governor, dated 26 February 1942. This program included the creation of several O.C.D. Emergency Hospitals and the expansion of existing civilian hospitals throughout the Territory as well as the establishment of Casualty Stations in strategic locations. Medical installations have been equipped with both materiel and personnel, and financed from O.C.D. funds. A close liaison has been maintained with the military services and many perplexing problems have been worked out together to the benefit of all concerned.

O.C.D. Emergency Hospitals—There are five such hospitals on Oahu with a total bed capacity of 1,300. The island of Maui has one O.C.D. hospital of 100 beds now being operated by the U. S. Army. Kauai has two with a total of 150 beds; Lanai and Molokai each have a hospital of 50 beds; and Hawaii has an O.C.D. hospital of 150 beds now being operated by the Olaa Plantation.

On Oahu, Wahiawa Emergency Hospital is a "going concern" which consists of 600 beds, 100 of which are set aside as an annex for the treatment of tuberculosis patients. During the past year this hospital has treated a total of 2,788 patients. Another O.C.D. hospital on Oahu is the Sacred Hearts Emergency Hospital which is a "going concern" absorbing the overflow of patients from other civilian hospitals. Sacred Hearts treated 2,716 patients during the fiscal year 1943.

Affiliated Hospitals—Every civilian hospital of the Territory is affiliated with the O.C.D., and each has expanded its facilities with O.C.D. funds. The details are too numerous for this report.

Emergency Medical and Ambulance Service—This division of the Emergency Medical Service operates 21 Casualty Stations in strategic positions throughout the City and County of Honolulu. Each outside island has a similar arrangement though on a smaller scale. In Honolulu there are about 25 ambulances on hand at all times with a standby of 250 commercial vehicles converted to ambulances to augment the service. The medical personnel of this division has trained 9,200 persons in first aid and casualty treatment. During the past fiscal year 7,461

patients have been treated at the various casualty stations. Approximately 50,000 dressings are prepared each month for the American Red Cross and hospitals, as are miscellaneous supplies such as sweaters, mosquito nets, screen covers, pneumo-thorax valves, etc. The ambulance section, in addition to furnishing ambulance service when the City and County Emergency Hospital requests such service, has transported innumerable shipments of medical supplies and in addition to their regular duties for Headquarters, gives an average of 500 man-hours per month to departments other than its own, including service to the Emergency Poliomyelitis Hospital, transporting patients, professional personnel and food.

Blood and Plasma Banks—The Territorial Director of Blood and Plasma Banks is responsible for providing adequate stores of blood and plasma throughout the Territory. Many such depots of plasma are scattered throughout each island of the Territory. At present the storage of plasma (liquid, frozen and dried) is adequate for any eventuality. During the period under report there were 12,643 donors, of which 11,735 have been cared for at the Main Blood Bank and/or the Mobile Unit and 908 at the branch Blood Banks maintained at various hospitals. One of the most important of the developments of the Blood Bank this last year has been its "lend-lease" program. Conditions incident to the war have made it hard for doctors to obtain professional donors at a moment's notice. So the custom has grown up of borrowing from the whole blood supply of the Blood Bank when it is needed, and then sending in friends or relatives to repay whatever amount of blood is borrowed. The same procedure is followed in borrowing plasma. During the period under report 129 different doctors have borrowed 1338 doses of whole blood and 83 doctors have borrowed 614 doses of plasma.

Nursing Service — The Territorial Director of Nursing Activities is responsible for the procurement and maintenance of the supply of nurses for the Territory insofar as hospital nurses are concerned. A total of 353 nurses have been recruited through this division to staff O.C.D. as well as other civilian hospitals of the Territory; 165 of this number went to O.C.D. hospitals and 188 went to civilian hospitals. In addition the O.C.D. nursing division has provided instructors for courses in anesthesia and home nursing, and for nurses' aides and ward helpers.

Casualty Information Service—The Casualty Information Service came into being on March 29, 1943. The purpose of this division is to gather information concerning casualties from all medical installations. In this way a central file is maintained and information concerning individual cases may be disseminated to the general public. About 75 C. I. S. reporters recruited from business women of the City of Honolulu have been assigned to posts in civilian and military general hospitals. This service is composed entirely of volunteers and will function only in case of a blitz or major disaster.

Epidemic of Poliomyelitis—Poliomyelitis in epidemic proportions made it necessary for the Office of Civilian Defense to convert its casualty hospital on the grounds of the Shriners' Hospital, Honolulu, into an Emergency Poliomyelitis Hospital. It was placed in readiness on April 19, 1943 and received 18 cases for active treatment that day. This hospital has been gradually expanded to the point where it now cares for 45 patients. This number of cases requires about two staff members per patient. The Medical Department of the U. S. Army supplied a complete staff of nurses and corpsmen to open the hospital and

gradually O.C.D. nurses have been added to the staff with the expectation that the Army nurses will eventually be released. There are 22 Army nurses, 20 O.C.D. nurses, 13 U. S. Army corpsmen, 3 maids, 2 physiotherapists, 1 medical director, and a rotating staff of volunteer physicians. The physical plant is loaned by the O.C.D. and the hospital is financed by voluntary public contributions.

Financial Report:

New Construction and Expanded	
Facilities	\$ 357,449.79
Equipment	266,962.30
Materials and Supplies	685,980.76
Personal Services	1,045,671.57
<hr/>	
Total	\$2,356,064.42
Budget	\$2,356,064.42

Personnel

Volunteers	1400 (approximately)
Paid personnel	586

H. L. ARNOLD, M. D.
Territorial Medical Director

EMERGENCY TREATMENT OF CONGESTIVE HEART FAILURE

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R. M. Tandowsky (American Heart Journal, October, 1942) states:

"The average time required for the development of maximal RS-T segment changes in the controls of this study after the administration of 1.6 mg. of lanatoside C

intravenously was 27.5 minutes as compared to six hours and fifteen minutes after giving 16 grains of digitalis purpurea by mouth.

"In the presence of congestive failure, the intravenous administration of lanatoside C produced the maximal alteration of the RS-T segment within two to three hours which was eleven to twelve hours sooner than when digitalis purpurea was given orally.

"Our observations indicate that lanatoside C will prove to be a valuable drug in the treatment of congestive failure, especially when quick action is desired or when gastrointestinal symptoms are troublesome."

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COUNTY SOCIETY REPORTS

MAUI COUNTY MEDICAL SOCIETY

Luncheon meeting was held Sunday, May 8th at 12:30 p.m. at the Wailuku Hotel. Present were six members and five guests. No business meeting was held because so few members were present.

Lt. Comdr. Ebling of the Naval Air Station, Puunene, gave a very interesting talk on "Atypical Appendicitis".

Luncheon meeting was held on June 13, 12:30 p.m. at the Wailuku Hotel. Present were eleven members and thirteen guests.

A lengthy discussion was held on the new Public Welfare Act which authorized the spending of government funds for the care of indigents. So far as was known the present plan is for the Government physicians to take care of all the indigent patients in their respective districts without any additional pay. It was felt that such a plan would be unfair to the Government physicians in certain districts in that there were too many indigent patients to care for on the Government physician's salary. Also such a plan would not give the patient a free choice of physicians.

The following recommendations were made:

1. Some of the Government physicians are underpaid for the work done.
2. The Society believes that in fairness to the indigent patient and to the physician the indigent patient should have a free choice of physicians and that remuneration for services should be made on a fee basis acceptable to the Department of Public Welfare and to the Medical Society.
3. The relationship of the Department of Public Welfare be further clarified with particular regard to the status and duties of the present Government physicians.

The Staff of the 22nd Station Hospital gave a program on the use of the sulfonamide drugs. There was much discussion particularly on the misuse and abuse of the sulfonamide drugs.

W. B. PATTERSON, M. D., Secretary

HAWAII COUNTY MEDICAL SOCIETY

At the invitation of the staff of the 156th Station Hospital, the 217th regular meeting of the

Hawaii County Medical Society was a joint meeting held at Kamuela at 2:00 p.m., May 30, 1943. Lt. Col. A. M. Mulligan, Commanding Officer, and Dr. L. L. Sexton, President, presided.

A scientific program of decided merit was prepared by Capt. D. F. Farmer, program chairman. Capt. C. J. Roberts presented a paper covering the clinical aspects of the wave of "Acute Infectious Hepatitis" occurring in the armed forces in the first year of war. He stated there had been some 2000 cases on the island, three of these terminating fatally. He gave case reports on the latter three, pointing out the symptoms of anorexia, nausea and pruritus. He was of the opinion that these cases were a toxic hepatitis rather than infectious hepatitis as designated by the Surgeon General and believed the etiological factor was related to vaccinations against yellow fever.

Lt. Fred Dick correlated the clinical and pathological findings in these cases. He exhibited gross and microscopic sections of the liver showing areas of toxic central necrosis of the liver lobules and areas of yellow atrophy. He believed the disease was on a toxic rather than an infectious basis.

Considerable discussion followed. Col. S. A. White stressed that with every war, and in the army, there have been sporadic outbreaks of hepatitis, the etiological factors varying from time to time. He cited the work of Dr. Tenbroeck, chief of the Princeton division of Rockefeller Institute, who later attended the meeting, and stated it was his opinion that the recent outbreak was caused by some fraction of the yellow fever vaccine.

Dr. C. L. Carter presented a very comprehensive paper on "Pasteurella pestis infections". In the twenty-odd years of his practice in the Hamakua district, he has had over 100 cases of plague; his paper covered his personal experiences with the disease, adding considerable color. Considerable discussion followed, dealing chiefly with methods of rat control and with therapeutic management. It was pointed out that encouraging school children to trap rats by rewarding them was an extremely dangerous hazard.

Dr. T. Keay presented a brief paper on his experiences with Weil's Disease. Dr. J. E. Alicata, Ph.D., of the University of Hawaii, who is at present conducting a survey of Weil's Disease, under the sponsorship of the Hawaiian Sugar Planters' Association, on the Island, discussed the prevalence of

Leptospira in the rat population on other islands and the laboratory diagnosis of Weil's Disease. Dr. Keay stated he had approached the Board of Health to furnishing laboratory diagnostic facilities but had been unsuccessful.

Dr. Tenbroeck was introduced and talked briefly on the influence of weather on the two ratborne diseases under discussion.

A short business meeting followed the scientific session. The minutes of the previous meeting were read and approved. Drs. H. W. Kurashige and L. R. Fernandez were accepted unanimously into the Society; Dr. Frank St. Sure's transfer from the Maui County Society was unanimously passed.

The Secretary was instructed to write the commanding general of the Hawaiian Department expressing the Society's complete satisfaction with the manner in which Capt. Flinter performed his duties during his service as health officer for the island. A letter from Mr. McMorrow stating that laboratory specimens may left at the central office of the Board of Health, as requested by the Society, was read.

Dr. Orenstein, who had been appointed to investigate the availability of funds for obstetric care of military personnel families, reported that he had conversed with General King who informed him that the Board of Health had been notified that private physicians and hospitals should be reimbursed for such services.

The 218th regular meeting of the Hawaii County Medical Society was held at 4:15 p.m. on June 22, 1943, at the Staff Room of the Hilo Memorial Hospital. The President, Dr. Sexton, presided. Twenty-one members and nine guests were present.

Dr. Crawford presented a paper on "Ocular Manifestations of Neurological Lesions."

Dr. Leslie reported on the recent tuberculosis survey of the teachers and school personnel of the island. Significant findings were found in the x-rays of 38 out of 782 cases (4.5 per cent of the total). 16 cases of clinically significant lesions are included, 9 of whom were advised to be hospitalized, and 17 were suspects. In addition, x-rays showed 24 others in whom cardiac pathology was found.

Dr. Crawford, delegate, gave a report of the meeting of the House of Delegates of the Territorial Association. He stated that it was the consensus that the society should oppose the one-year residence clause required before medical licensure. Dr. Patterson stated that he had informed the House of Delegates regarding the lack of coordination between the various component societies and the Territorial Association in regard to legislative matters; he reported that a general feeling obtained in Oahu that the parent association's legislative committee was

sufficiently active and that the component societies would be called on if their help was needed.

Another draft of the proposed constitution was presented by the by-laws committee. The President announced that the constitution would be up for adoption at the next regular meeting.

Lt. Col. Crozier of the Mt. View Hospital tendered an invitation on behalf of Col. White for a joint meeting. The President suggested this meeting be held in August.

M. LÉON CHANG, M. D., Secretary.

HONOLULU COUNTY MEDICAL SOCIETY

Summary of June and July meetings.

New members voted into the society were

LT. JEROME DUBOWY, M. C., A.U.S.
(Service member)

WM. S. ITO

K. TAKENAKA

D. L. BURLINGAME, transferred from Hawaii.

L. A. HONL, transfer from Kauai.

The application of Dr. M. Yamashiro was referred back to the Board of Censors for more data.

Hawaii Medical Service Association: Recommendations made by the Board of Governors were accepted by the membership at the evening meeting July 16th, as follows:

That the funds accumulated for 1942-1943 in the Physicians' Reserve be paid out to the individual physicians;

That the discount of 10% off all bills be continued; this to be placed in the Physicians' Reserve Fund.

That the medical director's salary be increased, our share being \$87.50 per month, to be taken out of the Physicians' Reserve Fund.

Dr. Strode was elected to the Board of the HMSA to replace Dr. Phillips, resigned.

Gallery of Photographs: The Board of Governors voted that the collection of photographs formerly hung in the library at Queen's be hung in the corridor leading to the library on the second floor of the Mabel Smyth Building. Decision as to how the expense will be met was deferred.

Medical Milk Commission: Recommendation made at the annual meeting that all milk be pasteurized was referred to the Board of Health for consideration.

Library: The Library Committee reported the necessity for employing a full-time library clerk which would increase the fixed overhead for 1943-1944 leaving a balance of \$429.00 for the purchase of

new books. The President appointed a special committee to go over the society's budget and plan a finance program, to include the increased library budget of \$3,000 voted at the annual meeting.

Food Handlers Examinations: Upon receipt of a letter from the Board of Health requesting the society's recommendations relative to food handlers' examinations, a meeting was arranged, attended by doctors from the Board of Health, laboratory men and representatives of the territorial and county medical societies, to study these examinations, which had been held for some time by the medical men to be inadequate and about which the question has often been raised as to whether they should be abandoned entirely or extended to guarantee a more thorough examination.

This group's recommendations were:

That it is an improper time to abandon the examinations entirely;

That examinations be taken out of the hands of the private physicians and passed on to the Board of Health,

That since (a) examination for enteric diseases is impractical and doubtful of results; (b) that transmission of venereal disease through food handling is a minimal danger; and that (c) there is a large incidence of tuberculosis among food-handlers and examination for tuberculosis is practical, the Board of Health be asked to carry out a limited examination, stressing tuberculosis, and employing its own physicians to do the job.

These recommendations were brought to the general membership for vote on July 16th. There was objection to taking these examinations out of the hands of the private physicians, and on vote (9 for and 14 against) the committee's recommendations were not adopted, but deferred until the next meeting.

Maternity Bed Shortage: Dr. Bowles' report to the Board of Governors on July 2nd of an informal meeting of the obstetricians and their plea that something be done about the shortage of maternity beds, as well as surveying the total hospital situation in Honolulu, brought the following results:

A meeting was called of hospital trustees where-in there was general agreement as to the need for immediate beds;

Data were collected by the medical society and submitted in a comprehensive report to the Public Health Committee of the Chamber of Commerce, the Board of Health and the Hospital Association with a plea that these agencies use all their facilities to bring about

a. immediate temporary construction of hospital facilities, if on examination of the facts this is thought feasible; or

b. release of money, materials and personnel, as well as securing priorities, shipping space, or whatever is necessary to build without delay as planned under Lanham Act grants;

c. a survey of the total hospital situation in Honolulu for future planning

Wide publicity was given to the report in both newspapers.

The Secretary was instructed to compile a list of doctors currently on city and county service with all the hospitals, this list to be used when asked to recommend doctors in the specialties.

The following doctors in active military service were exempted from payment of dues and assessments:

H. M. CHANDLER, Lt. Comdr. (M.C.) USNR,
ARCHIE CHUN-MING, Captain (M.C.) A.U.S.,
EDWIN K. CHUNG-HOON, Major, (M.C.) A.U.S.
DONALD S. DEPP, Captain (M.C.) A.U.S.
ROBERT KATSUKI, 1st Lieut., (M.C.) A.U.S.
ISAAC A. KAWASAKI, Capt. (M.C.) A.U.S.
W. F. MACKLIN, Lt. Col., (M.C.) A.U.S.
LESLIE LUKE, Lt., (M.C.) A.U.S.
DAVID L. PANG, Major, (M.C.) A.U.S.
OGDEN D. PINKERTON, Captain (M.C.) A.U.S.
F. W. THOMPSON, Lt. Comdr. (M.C.) USNR
F. H. TONG, Major (M.C.) A.U.S.

Report of Dr. Pinkerton, delegate to the A.M.A. meeting, was heard at the membership meeting July 16th. This report will appear elsewhere in the JOURNAL.

Blood Bank: The society was asked to lend its support to continuing the blood bank on a peace-time, self-supporting basis.

Welfare Bill, providing payment for hospitalization and medical services (Act 36, Session laws 1943). Apparently there is available under this Act about \$300,000 to the counties on a reimbursable basis from Department of Public Welfare funds, and Dr. Moysman has been asked by the Welfare Department to help outline procedures for carrying out the intent of the law. He reported that provision could be made to pay physicians on C & C service and wanted recommendations from the society as to the basis on which this should be proposed.

This was studied by the Committee on Forms of Medical Practice, and after considering various alternatives, it recommended:

That there be added to the City & County's bill for hospitalization to the Department of Welfare a 20% charge for professional services of the doctor, and that this money, when paid, go into a general fund of the Honolulu County Medical Society.

It was estimated, on the basis of the \$60,000 hospitalization bill of the City & County last year, the 20 per cent charge would net the fund \$12,000 per year.

R. H. HILL, M. D.,
Rec. Secretary

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of
HOTEL IMPORT COMPANY

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FIFTY-THIRD ANNUAL MEETING HAWAII TERRITORIAL MEDICAL ASSOCIATION

May 21, 1943

MABEL SMYTH BUILDING AND PACIFIC CLUB, HONOLULU

No scientific sessions were planned this year, the Council and House of Delegates only meeting.

MINUTES OF MEETING THE COUNCIL

Present: Dr. R. O. Brown, presiding; Drs. Phillips, Benyas, Bell and Withington.

The absence of Mrs. Bolles on the mainland was discussed.

Action: It was voted, upon motion by Dr. Phillips, seconded by Dr. Bell, that in addition to the 6 weeks accumulated vacation, Mrs. Bolles be granted 2 weeks leave of absence with pay.

MINUTES OF MEETING HOUSE OF DELEGATES AND COUNCIL

Present:

President—R. O. Brown

Secretary—Douglas B. Bell

Treasurer—N. M. Benyas

Vice-President: H. M. Patterson

Councillors: L. G. Phillips, Paul Withington, F. J. Pinkerton

Delegates:

Honolulu—J. E. Strode, G. C. Milnor, A. G. Schnack
Arthur Davis, Maurice Gordon, Frank Spencer
James Kuninobu

Hawaii — H. E. Crawford

Reports: The following reports were read and upon due action voted to be accepted and placed on file, except the Treasurer's report. It was voted to refer this to the incoming council for audit.

1. Reports of component societies—Kauai County (Exhibit A), Hawaii County (Exhibit B), Honolulu County (Exhibit C)
2. Report of the Council (Exhibit D)
3. Report of the President (Exhibit E)
4. Report of the Secretary (Exhibit F)
5. Report of the Treasurer (Exhibit G)
6. Report of committees:
 - a) Journal Committee (Exhibit H)
 - b) Public Policy and Legislation (Exhibit I)
 - c) Cancer Committee (Exhibit J)
 - d) Psychiatric Committee (Exhibit K)
 - e) Medical Advisory Committee to Bureau of Maternal and Child Health (Exhibit L)
 - f) Health Education Committee (Exhibit M)
 - g) Board of Management-Mabel Smyth Building (Exhibit N)
 - h) Library Committee (Exhibit O)

Legislation: Dr. Crawford stated the outside Islands felt out of touch with the legislative matters. Dr. Phillips explained that it was necessary to leave decisions to Committees on the job here; when help from the outside counties was needed word would be sent to them.

Dr. Pinkerton suggested that all the ground work be laid before the Legislature meets.

Dr. Crawford brought up the matter of the one year residence clause. Dr. Withington explained that the

Honolulu County Medical Society was on record as being opposed to the one year residence clause, and he suggested that the Territorial Association reiterate that stand.

Action: It was voted that the Territorial Association is opposed to the one year residence clause in the Medical Practice Act and that objection to the law be referred to the Legislative Committee for investigation and action.

An editorial prepared by H. L. Arnold, Jr., for publication in the JOURNAL was read, re lack of a proper investigator in violent and unattended deaths.

Action: It was voted that this matter be referred to the incoming Legislative Committee.

A.M.A. Delegate: Dr. Brown stated that Dr. F. J. Pinkerton had been elected Delegate to the A.M.A. Meeting at the last Council meeting, and asked for confirmation of this action.

Action: It was voted that the election of Dr. Pinkerton as Delegate to the A.M.A. Meeting be hereby confirmed.

A resolution was adopted for the delegate to take to the A.M.A. meetings, as follows:

“RESOLVED that Dr. F. J. Pinkerton, the Delegate to the American Medical Association Meeting, use every possible effort to have the assembly recognize the necessity of including the entire civilian population of Hawaii in all provisions for medical care.

RESOLVED that there be no separation in military and civilian problems, particularly in the line of medicine. Stress the shortage of nurses and doctors in civilian life, and the overcrowded condition of civilian hospitals.”

In discussion of this, it was emphasized (1) that the backbone of the service is the civilian population; (2) that in this war and the last, there was very little distinction between the military and civilian hospitals, but in Hawaii today, there is a marked differentiation between St. Louis, Farrington, and Aiea Hospitals and our local civilian hospitals; (3) that defense workers are being cared for by the civilian doctors and in civilian hospitals.

Date & Place of 1944 Meeting:

Action: It was voted that the time and place of the next meeting be left to the discretion of the Council.

Election of Officers

The Nominating Committee consisting of Drs. Pinkerton, Strode and Withington presented the following ballot:

President Dr. Douglas Bell
Secretary Dr. A. V. Molyneux
Treasurer Dr. Stewart Doolittle

Maui Councillor Dr. R. J. McArthur
 (to replace Dr. Gordon Lightner)
 Kauai Councillor Dr. S. R. Wallis
 (to succeed himself)

Action:

The report of the Nominating Committee was accepted and the Secretary instructed to cast a unanimous ballot for the election of these officers.

Report of the Kauai County Medical Society (EXHIBIT A)

I. UMAKI, M. D. Secretary

The Kauai County Medical Society met regularly on the second Wednesday of each month. Attendance was good although the hours were not convenient for many.

During the first half of the year, meetings were mainly concerning the emergency medical service matters. Following the initial period immediately following the 'blitz' reorganization and refinement of the emergency medical services took much of the Society's time. Matters of policy, decisions concerning the members of the society, etc. were brought up and discussed at length.

During the latter half of the year it was decided that individuals be assigned specialties on which to prepare papers for presentation at scheduled meetings and to prepare directives to be followed for general types of injury for approval by the members so that treatment throughout the island would be as uniform as possible. Although this program is not yet completed, it was felt to be time well spent.

During the year two additional hospitals under the O. C. D. have been completed, the Huleia and the Waimea. The O. C. D. Makaweli Hospital, likewise completed, has been transferred to army use with provision that civilians may be hospitalized in time of emergency. Other hospitals have been enlarged to accommodate possible casualties. Problems of equipment and nursing help, which latter has been of much concern, have at various times been discussed at society meetings. Solution distant future.

Activities for the year revolved mainly around O. C. D. affairs, a fuller report may be had by referring to the report of the Kauai Emergency Medical Services.

Report of the Hawaii County Medical Society (EXHIBIT B)

M. L. CHANG, M. D., Secretary

Scientific

The scientific sessions during the year have had much of interest added to them by the presence of and active participation by the military medical personnel: Specialists in surgery, internal medicine, dermatology, ophthalmology and otolaryngology, roentgenology and pathology have contributed materially to the discussions, and papers presented were as follows:

Symposium on "Weil's Disease"—Drs. R. Eklund, T. Keay, H. M. Patterson
 Symposium on "Bronchoscopy in the Diagnosis & Treatment of Pulmonary Tuberculosis" — Drs. E. Tompkins, H. E. Crawford, M. L. Chang

"Care of the Premature Infant"—Dr. T. Yoshina
 Various scientific papers by the medical staff of the Mt. View Army Hospital

"Dermatophytosis"—Dr. M. H. Chang

"Cotton as a Suture Material"—Dr. W. N. Bergin

"Diagnosis and Treatment of Early, Late and Latent Syphilis" including a colored sound movie released by U. S. Public Health Service—Capt. Marcus Plinter, M. C., local Health Officer

Consultation and Differential Diagnosis of X-Ray Lesions—Major Waldemar Sternberg, M. C.

Public Health

The Venereal Disease Committee has continued to function: it has worked in close cooperation with the local military and civilian health authorities in the control of venereal disease. The Society did not deem it advisable to adopt the resolution proposed by the Board of Health in regard to the repression of prostitution.

In July and August, 1942, the Society assisted the Board of Health in its mass typhoid and smallpox immunization program.

A mild epidemic of pertussis occurred during the year and the Society requested the local Board of Health to furnish pertussis vaccine for the immunization of indigent cases. This request was not granted.

An increase in the incidence of trichinosis on the island led to the recommendation of the Society for an educational program in the schools stressing thorough cooking of pork and garbage.

The endemic nature of Weil's disease on this island was again emphasized. The Hawaiian Sugar Planters' Association recently granted \$2,500.00 for a study to be conducted by Dr. J. Alicata of the University of Hawaii. This study is well underway. It was felt that the Board of Health should include in its program permanent facilities for the diagnosis of this disease.

The Society is cooperating with the school authorities, the sanatorium and the tuberculosis society in the conduct of various tuberculosis surveys. Several student surveys have already been made; a recent survey of all school employees is nearing completion. A survey of food-handlers is contemplated; it is believed that such a survey would emphasize the inadequacy of the present food handlers' examination and would stimulate the public and the legislators to modify present regulations to include chest x-rays.

Legislative Matters

The Legislative Committee has continued to function, although it was once more brought out that lack of coordination of the component societies with the Territorial Association has resulted in ineffectiveness. The delegates of this Society were instructed to discuss this at the annual meeting.

No definite recommendations were made by our committee since it had no understanding of the policies of the Territorial Association's Legislative Committee. During the legislative session, the Society sent registered letters to all legislators stating that it was unalterably opposed to lowering the qualifications for the position of Territorial Commissioner of Public Health.

Civilian Medical Defense

Two meetings were devoted entirely to this program; some phase of this program was discussed at every meeting of the Society. During the year adequate equipment and supplies were procured and ambulances obtained. The casualty stations were decentralized and met at fairly frequent and regular intervals until recently when the shift to volunteer personnel reduced them to skeleton crews thought to be sufficient and well-trained. The mass drill held in July was reported to be about 75% successful; all casualty stations and hospitals in the set-up participated.

In September, 1942, the O. C. D. took over from the Hilo Memorial and Puumaile Hospitals the operation of the blood bank. The program was under the direction of Dr. C. B. Brown and the Society participated by supplying volunteer physicians. Its activities are very limited at present by order of the O. C. D.

The O. C. D. hospital at Olaa was completed in February, 1943; the set-up directed by Dr. L. L. Sexton has continued, and periodic practice drills have been held.

Miscellaneous

- 1) The arrival of the Index Medicus has stimulated interest in the maintenance of a library, and a standing Library Committee was appointed, with \$300.00 appropriated to initiate the program. Many members are contributing to the Library, as are the hospitals.
- 2) The By-Laws Committee has submitted a draft of a revised Constitution which will be adopted in the near future.
- 3) Puumaile Hospital has enlarged its consulting staff to include the specialties of thoracic surgery, general surgery, urology, pediatrics, medicine, ophthalmology and otolaryngology and obstetrics and gynecology.

Personnel

There has been a marked shift in personnel during the past year:

Dr. W. D. Balfour of Pahala has been transferred to the Maui County Society; he has been replaced by Dr. R. Eklund, formerly of Pepeekeo. Dr. L. R. Fernandez has replaced the latter at Pepeekeo.

Dr. E. Tompkins has been transferred to the Maui County Society and is now serving as Superintendent and Medical Director of Kula Sanatorium. Dr. W. F. Leslie, a transfer from the Honolulu County Society, has replaced him as Superintendent and Medical Director of Puumaile Hospital.

Dr. R. P. Wippermann, a transfer from the Honolulu County Society, is now located at Naalehu, Kau.

Dr. D. A. Burlingame of Hakalau has recently transferred to Honolulu. He is being replaced by Dr. F. A. St. Sure, a transfer from the Maui County Society.

The following have left the island for the mainland: Dr. T. Kutsunai, formerly of Papaikou, Dr. A. T. Roll, formerly of Hilo, Dr. O. K. Tokufuji, formerly of Honokaa, and Dr. R. T. Treadwell, formerly of Kohala.

Report of the Honolulu County Medical Society

(EXHIBIT C)

F. J. HALFORD, M. D., Corresponding Secretary

During the past year the Society had its regular meetings in the Mabel Smyth Building at 9 a. m. on Thursday mornings, during which time various papers were presented, the majority of which were given in detail in the HAWAII MEDICAL JOURNAL. Many members feel that during 1943, we should return to monthly evening meetings, in this way more men will be able to attend and our scientific program will perhaps be more prolific.

Your secretarial office has continued to function in an excellent manner aiding not only in the distribution of gasoline cards but also liquor permits and has served as an excellent clearing house for the entire profession.

The Board of Governors continued its regular meetings monthly and a tremendous amount of material had to pass through this branch of the Society; in fact, it is well to call attention to the fact that some of our doctors served on as many as four or five committees and practically every afternoon was taken up with duties which pertained to the Medical Society.

The Committee on Workmen's Compensation met eight times during the past year and had numerous informal meetings and discussions. This committee feels that the entire industrial accident fee schedule should be reviewed and changed to include the three following major considerations:

- 1) Amplification and more comprehensive itemization to include listings that were not included in the original fee schedule, and also to include definitions and listings of new procedures that have become by practice considered industrial accident items.
- 2) A definite increase in certain items due to increased medical salaries, care, rent, drugs and general expenses.
- 3) A definite reduction in the schedule for industrial accident procedures which in the past have been too high.

The Preparedness Committee functioned under the chairmanship of Dr. Harry L. Arnold. Dr. George Baehr, Chief Medical Officer of the National Office of Civilian Defense surveyed the medical O. C. D. in February, 1943 and his studies of the activities directly originating from this Society were commented upon not only in public but also in the higher circles of our local and national government. It is needless to say that there have been controversies concerning the medical O. C. D., but these have been small in comparison to the tremendous amount of work accomplished and the Society went on record for the retention of first aid stations when pressure was being exerted to discontinue some of them as an economic measure. Discussions were held concerning civilian hospitals and shortages; at present a 30-bed contagious building has been constructed and a kitchen remodelled; a 30-bed evacuation ward was authorized for Queen's Hospital and it is hoped that the 30-bed obstetrical unit for St. Francis Hospital will soon find its development in process.

The Committee on Forms of Medical Practice held one meeting during the year to consider medical services for firemen; since the wages of this group

are considerably lower than many defense workers in the community, no changes were made in the fee schedule applicable to firemen and their dependents.

The report of the Medical Milk Commission by Dr. William Winter, chairman, at the annual meeting clearly showed that all is not well with the milk industry as far as certified milk is concerned. The recommendation of this commission that it may be feasible to request pasteurization of certified milk in order to guarantee a safe product for the community will be studied in the light of a scarcity of workers, increased cost of dairy hands and other costs relative to the production of certified milk.

No post graduate course was given this year, your committee feeling that the time was inopportune and since there was difficulty in obtaining a satisfactory lecturer. It may be that with the lifting of the blackout and reduction of defense worker population which will reduce the "patient load," it may be possible for us to have a graduate course as in the past.

It is also noteworthy to quote the letter from General Emmons giving recognition to your Society for its outstanding work on December 7th, 1941, although it comes a year late:

"The records of this Headquarters show that early in 1941 your Society was asked by a representative of the Department Commander to take action toward preparing for the collection, first aid treatment, and transportation to hospitals of persons who might be injured in the event of war, particularly civilians. The request was for action on a voluntary basis. The response of your Society was wholehearted and enthusiastic and the action taken was largely instrumental in the attainment of a high degree of medical preparedness. One of the elements of this preparedness thus created was the organization of medical men into "teams," surgical, shock, fracture, and others, and their assignment to hospitals civil and military, and to other posts of responsibility to which they agreed to report in case of need. The Japanese attack on 7 December 1941 subjected the organization thus created to a severe test. The work of the members of your Society on that occasion at Tripler General Hospital, and elsewhere, was of a very high standard, and was performed calmly and expeditiously under conditions by no means without danger to life.

"While this service has previously been publicly acknowledged with thanks and such acknowledgment printed in one or more publications, I desire at this time to formally commend your Society, as such, and its members individually, for their outstanding services during the 7 December 1941 and the days immediately following."

Report of the Council (EXHIBIT D)

D. B. BELL, M. D., Secretary

The Council has held only three meetings this past year.

At one of these meetings held February 5, 1943, Councilors from Maui and Hawaii were present. At this meeting it was decided to invite either Drs. Carl Meyer or N. E. Wayson to come to Hawaii and give

a course in tropical medicine. Should it be impossible for them to come, then it was the consensus of opinion that no formal meeting should be held this year.

The Legislative Committee made recommendations regarding certain legislation and the problem of proper examination for food handlers was discussed. Dr. Benyas explained the need for a convalescent home. The increase of the monthly rental for the Mable Smyth Building from \$25 to \$40 per month was approved. It was also voted that the \$500 library appropriation should be turned over to the library.

The second meeting of the Council was held on April 8, 1943. No outside island Councilors were present. At this meeting the only business had to do with the adoption of the Resolution by Dr. L. G. Phillips of the Legislative Committee dealing with Senate Bill No. 92 which reorganized the Territorial Board of Health and deletes all professional and experience qualifications of the executive officer of the Board. The Resolution was adopted and placed before Governor Stainback.

The third meeting of the Council was held on April 9, 1943. No outside island Councilors were present. At this time the date of the Annual Meeting, May 21st, was set.

Report of the President (EXHIBIT E)

R. O. BROWN, M. D.

After the February meeting of the Council, an attempt was made to get either Dr. Wayson or Dr. Carl Meyer to come and meet with us at the Annual Meeting and present what papers they would. Dr. Carl Meyer said it was impossible for him to come but he named one of his associates whom he thought might be a satisfactory individual. On inquiry none of us knew him, or of his ability as a speaker, and it was decided not to invite him. Dr. Wayson, because of pressure of work, was unable to accept at this time and expressed the desire to come later in the year. Nothing was done to bind next year's officers to Dr. Wayson's proposed trip. It was thought possibly to bring him over as a post graduate speaker.

The Board has been inactive during the year. Trips to the outside islands were not made, partially because of pressure of work and partially because of the uncertain transportation conditions.

Report of the Secretary (EXHIBIT F)

D. B. BELL, M. D.

The total regular membership of the Association is 263, a decrease of 9 over the previous year. By counties this membership is made up as follows:

	Regular Members	Members in Service	Service Membership	Associate, or Life Members	Honorary Members
Hawaii	37	—	—	—	—
Honolulu	194	25	19	16	—
Kauai	14	3	—	3	—
Maui	18	6	—	2	—
	263	34	19	21	—

The total number of physicians practicing medicine in the Territory as of May 15, 1943 is 337. Of those

eligible, 317 belong to the Association, making 89%, as compared to 88% last year.

Treasurer's Report (EXHIBIT G)

Covering the Period
June 1, 1942 - May 15, 1943

CASH ON HAND, June 1, 1942	\$1,373.11	
Checking Account	\$687.23	
Savings Account	685.88	
RECEIPTS	7,386.90	
Membership dues	\$4,725.00	
Registration fees—		
annual meeting	374.00	
Journal:		
Advertisements	1,867.31	
Subscriptions and Cash Sales..	413.84	
Interest Savings Account	6.75	
		\$8,760.01

DISBURSEMENTS

Annual Meeting	\$ 292.99	
Journal	3,536.90	
Postage	40.30	
Mimeographing	7.52	
Salary	1,485.30	
Rental	375.00	
Miscellaneous	518.84	
Library Appropriation \$500.00		
Victory Tax	14.70	6,242.55
BALANCE May 15, 1943	\$2,517.46	

Checking Account \$1,800.35.

Savings Account 717.11

Journal Committee (EXHIBIT H)

H. L. ARNOLD, JR., M.D., Editor

Since the last annual meeting of the Hawaii Territorial Medical Association, the proceedings of which were published in the July, 1942 issue of the JOURNAL, we have published three issues of the second volume, and the fourth is in press. These three issues total 184 pages, of which 71 are of original articles, 62 of advertisements, 18 of regular feature articles, and between 7 and 9 pages each of editorials, county reports, news items, and an index catalogue of the County Medical Society Library.

The original articles are twenty-two in number; twelve are by civilian physicians (only one of whom is from an outside island), four are by Army doctors, three by Navy doctors, and three by authors not doctors of medicine. Eight of them, those comprising the subject of the disposition of war casualties and published in the September-October issue, were commented on in detail in an editorial in the December 12, 1942 issue of the Journal of the American Medical Association.

The date of publication of each issue of the JOURNAL is at present deplorably late. This is due entirely to labor problems, our printer having had to do a large part of the actual printing job with only one assistant. If things grow no worse, I believe these delays can be tolerated for a long while yet without altering the status quo.

With the final issue of the first volume of the JOURNAL, the editors made some minor changes in the staff, altering Mrs. Bolles' title from Secretary and Business Manager to Managing Editor, as being more in keeping with the scope and nature of her services to the organization, and reducing the staff of Associate Editors from 5 to only the 3 outside-island representatives. With the second issue of the current volume, Dr. Seiler replaced Dr. Jones as Associate Editor for Maui and with the fourth issue someone will have to in turn replace Dr. Seiler, who is now on Molokai. Dr. William Patterson has been invited to assume this position but has not yet either accepted or declined. At all events, this type of staff seems to be the most suitable from all points of view.

A detailed financial report will have to await the return from the mainland of the Managing Editor, Mrs. Bolles.

Your committee respectfully represents that the HAWAII MEDICAL JOURNAL is still a going concern and a credit to the medical profession of the Territory of Hawaii, and recommends that its status be left unchanged for the ensuing fiscal year, and that 650 copies of each issue, instead of 500, be printed, at an estimated increase of costs from about \$512 to about \$564.50, per issue.

The disposition of our copies is as follows:

Association members	298	
Medical Libraries	25	
Other paid subscriptions	71	
Total paid	394	
Exchange with other journals	58	
Advertisers	34	
Gratis copies	16	
Total unpaid	108	
TOTAL COPIES	502	

To meet this mailing list and still hold copies in reserve, we have had to put our advertisers off with tear sheets. This is, of course, an unsatisfactory situation. We should have the JOURNAL in more medical libraries and we should hold at least 100 copies of each issue in reserve.

Report of the Legislative Committee (EXHIBIT I)

L. G. PHILLIPS, M.D., Chairman

One meeting of the committee was held prior to the opening of the 1943 legislative session, and matters pertaining to proposed legislation were discussed. Subsequently conferences were held by the chairman with various individual members of the committee as the developments in the legislature required.

Your committee, and especially its chairman, was greatly handicapped by the absence of Mrs. Bolles from the Territory during the session of the legislature. Her untimely and, to the chairman, unannounced vacation, made it impossible for the committee to keep in as close touch with legislative developments as would have been possible had her services been available.

Your committee was represented by its chairman at hearings on various bills pertaining to public health matters before committees of the House and Senate.

Opposition was registered by the chairman to the legislation which revoked the law prescribing the educational and experience qualifications of the Territory's chief health officer, and reorganizing the Board of Health. Assistance in this opposition was secured from the Chamber of Commerce Health Committee, the Hawaii Tuberculosis Association, the nursing profession, and various individuals. Our representations to the legislators were without avail, and the law was passed over our protests.

Your committee was also represented at a hearing relative to a bill proposed by the naturopaths, which as drafted would have opened the way for naturopaths to practice every kind of healing art conceivable. This bill died in committee.

Your committee was also represented at a hearing on the bill requiring blood tests for syphilis on all pregnant women. This bill was passed and has become a law.

The bill requiring blood tests for syphilis of couples contemplating marriage was held up because it was considered doubtful of passage and insistence upon its presentation would probably have jeopardized the acceptance of the bill relative to blood tests for pregnant women.

Report of the Cancer Committee (EXHIBIT J)

G. A. BATTEN, M. D., Chairman

It is a pleasure to be able to state that the deep x-ray therapy unit has now been installed in the Queen's Hospital and is in operation. In addition thereto a Tumor Clinic, patterned after the requirements of the American College of Surgeons for such a clinic, has been organized and is in operation, meeting once a week at the Queen's Hospital. This makes the set-up for the treatment of malignant diseases in the Territory complete and available to all who can reach Honolulu.

This Committee has approved cancer publicity being carried on by the Chamber of Commerce—the Committee feeling that an outside agency could more diplomatically handle such publicity than could the medical organization itself, and since this agency was in a position to supply the funds, making it unnecessary to raise money by outside sources. It is agreed that the Territorial Medical Association, through its Cancer Committee, supply speakers and approve all material to be given to the public. We recommend that this arrangement be approved by the Council of the Territorial Medical Association.

It may be stated that in addition to the deep x-ray unit at the Queen's Hospital there is one at Kuakini Hospital, and two in the offices of private physicians. The Queen's Hospital, however, is the only agency that has together with the deep x-ray unit, a full-time roentgenologist, a full-time pathologist and adequate surgical facilities. Attention of the members of the Territorial Medical Association should be called to the fact that the Tumor Clinic at Queen's is ready to give diagnostic service on any case referred by physicians. No treatment will be given a patient referred to this group and no opinion rendered to the patient himself; such opinion will be given only to the physician referring the patient to the Clinic.

Report of the Psychiatric Committee (EXHIBIT K)

R. D. KEPNER, M. D., Chairman

Since the last annual report, three meetings of our Committee were held.

The Hawaii Territorial Society for Mental Hygiene, which last year's Committee was instrumental in starting, completed its organization on July 13, 1942, and is gradually increasing its activities. It is hoped that all members of the Association will lend their support to the Society's endeavors.

A review of Dr. F. G. Ebaugh's 1937 report, "Recommendations for a Mental Health Program in Hawaii," showed that five of his six major items had been taken care of at least in part, through various agencies, viz.: (1) recodification of existing laws regarding the treatment of mental patients; (2) reorganization of administration and treatment facilities at the Territorial Hospital; (3) creation of a territorial psychiatric clinic; (4) development of psychiatric departments and facilities in the general hospitals in the community; and (5) organization of a mental health committee.

Progress on the other item—community education—is being made by various agencies, including our Committee. One of our members has assisted in preparing material on mental hygiene for distribution to parents through school children. Our services have been offered to the Office of Civilian Defense should they desire our help in the dissemination of information on mental hygiene. All members of our Committee have been asked to prepare, for publication in the HAWAII MEDICAL JOURNAL, an article dealing with some phase of mental hygiene in the Territory; two papers have already been submitted and several more are in the process of preparation. Some of our members are participating in a series of eleven psychiatric clinics to be given at the Medical Society meetings one Thursday of each month; five of these clinics have already been held.

The I plus S equals R Reaction—Dr. McNiel
Organic Reaction Types—Dr. Kepner
Toxic Reaction Types—Dr. Shanahan
Schizophrenic Reaction Types—Dr. McNiel
Affective Reactive Types—Dr. Shanahan
Psychopathic Personality—Dr. Kepner
Mental Deficiency—Dr. McNiel
Paranoid Conditions and Paranoia—Dr. Shanahan
Involuntary Psychoses—Dr. Kepner
Psychoneuroses—Dr. McNiel
Child Psychiatry—Dr. Shanahan

No particular attempt has been made to disseminate information on mental hygiene to the general public in view of the fact that the Hawaii Territorial Society for Mental Hygiene has obtained permission to use certain copyrighted materials on mental hygiene from various sources, and plans to print this in small installments in the newspapers soon for their enlightenment.

Our Committee felt it inadvisable at this time to recommend any specific projects for next year's Committee.

Grateful appreciation for their cooperation during the year is hereby extended to the other members of the Committee: Drs. M. F. Chung, R. B. Faus, M. F. Haralson, Archie Orenstein, E. E. McNiel, W. M. Shanahan, E. A. Stephens.

**Medical Advisory Committee to
Bureau of Maternal & Child Health
(EXHIBIT L)**

O. LEE SCHATTENBURG, M.D., Chairman

Because of unusually difficult travel restrictions, the Bureau of Maternal & Child Health has not functioned during the past year; this Bureau Committee is represented by the various islands.

Problems of policy which have come up have been handled entirely within the Board of Health until such time when the Committee can function again.

**Health Education Committee
(EXHIBIT M)**

RICHARD K. C. LEE, M.D., Chairman

The Committee met with the Director of Health Education of the Department of Public Instruction to discuss policies regarding the medical examination of school personnel. Five active cases of tuberculosis among school teachers were brought to his attention and since the school health policy of the Department of Public Instruction and the Board of Health recommends the x-ray and fluoroscopic of all school personnel, he requested a definite recommendation from the Medical Society on this subject.

After some discussion the Committee recommended that the Department of Public Instruction and the Board of Health cooperate in planning an x-ray survey of all school personnel. All cases of suspected or active tuberculosis would be referred to a private physician or to a proper agency for care and supervision. This has been accomplished on the Islands of Oahu, Hawaii, and Kauai up to the present time.

The Committee also recommended that the present regulation of the school health policy governing medical certificates be continued.

No further meetings or business were conducted by the Committee during the year.

**Board of Management
Mabel Smyth Building
(EXHIBIT N)**

L. G. PHILLIPS, M.D., Chairman

The Hawaii Territorial Medical Association has been represented on the Board of Management of the Mabel Smyth Memorial Building by the oversigned, and Dr. F. J. Halford, who, with Mrs. Thelma Akana and Miss Sinclair, representing the nurses, and Charles F. Honeywell, representing the Queen's Hospital Board of Directors, constitute the Board. The oversigned has served as Chairman of the Board.

At the beginning of 1942 there was an outstanding debt chargeable to the building fund of several thousand dollars. Through the generosity of Honolulu physicians this debt was entirely wiped out by subscriptions during the month of December, and the building was enabled to begin the new year in a debt-free condition and with an unexpended balance in the building fund of \$655.00.

When one considers that the cost of the building and its contents was in excess of \$120,000, the fact that every cent of this cost has been met is extremely gratifying.

When the building was opened for usage there was some question as to what the cost of operation might be, and what receipts from earnings might amount to. This was further complicated by the onset of the war, which made it impossible to use the building, and especially the auditorium, at night.

Early in 1942 a deficit in maintenance finances was anticipated by the Board of Management and subscriptions were solicited from a number of physicians to help meet this deficit. In consequence, the building's receipts exceeded expenditures during the year by a few dollars.

In November, 1942, the Board of Management reviewed the building's experience of the past two years, and on a basis of this experience, adopted a revised budget which contemplated not only meeting current expenses, but setting up a reserve fund against depreciation of the building's contents. In order to do this, it was necessary to increase the monthly rentals of the several participating agencies. These increases were accepted by the various agencies.

Receipts other than rentals have come principally from the rental of the auditorium and from charges made for teas, luncheons, banquets, and so forth.

The Chairman of the Board of Management regrets to report that in his opinion the present managerial arrangement is unsatisfactory. The present manager has done an excellent job, and is to be commended for the performance of that portion of her duties which relate to hostess activities, but in the opinion of the Chairman, has not functioned equally well as business manager for the Building.

This situation was called to the attention of the Board of Management in November and December, but while admitting the facts as stated, the other members of the Board did not see fit to take action. This information is submitted here for the record.

The Mabel Smyth Memorial Building is serving a worthy purpose, and the benefits accruing to the nursing and medical professions and to the community at large are apparent to all. A greater field of usefulness remains to be developed.

The Building has been used freely and with much enjoyment and benefit not only by local residents, but by members of the nursing and medical divisions of the armed services stationed in Hawaii. The appreciation of the latter has been frequently and enthusiastically expressed.

**Report of the Library Committee
(EXHIBIT O)**

H. H. WALKER, M. D., Chairman

During the year four meetings of the Library Committee of the Honolulu County Medical Society were held at which times routine operational matters were reviewed, minor changes in policy adopted, new book and journal acquisitions studied and authorized, and discussions held relative to future plans for the growth of the Library.

A great many hours of work have been devoted by Mrs. Bolles and her assistant to the multitude of details necessary to promote the organization, operation and growth of our library. The expert services of Mrs. William Shanahan in a consulting capacity have been of inestimable value in establishing and developing the present system of index and classification, and otherwise in advising on technical matters. The Society is deeply indebted to these individuals for their unflagging efforts in building the library to what it is today.

Our outstanding acquisition of the year was the major portion of the library of the Kalihi Receiving Station which, thanks to the kind offices of Dr. Linson, was obtained on an extended loan basis. This collection, consisting largely of bound volumes of numerous journals extending back over many years, greatly enhances the value of our reference library.

Operating expenditures for the year will total ap-

proximately \$1,850, of which \$350 is allotted for new book purchases authorized but not as yet acquired.

Attached is the budget for the ensuing year, as approved by the Committee and recommended for adoption. The total budget calls for \$2,786, of which \$986 is for current overhead expenses, and \$1,800 for proposed additional expenditures, including the purchase of new books and journals (\$600), book-binding (\$800), fees for consultant librarian service (\$200), and miscellaneous supplies and equipment (\$200).

In submitting this budget, which exceeds previous yearly expenditures, it is the desire of the Committee to bring to the attention of the Society that the library cannot continue to function effectively on the budget hitherto allotted, and that the proposed budget represents a most modest expenditure for the privilege of possessing an adequate medical reference library in Hawaii.



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Try Petrogalar on your next group of patients.

*Reg. U. S. Pat. Off. Petrogalar is an aqueous suspension of pure mineral oil. Each 100 cc. of which contains 65 cc. pure mineral oil suspended in a flavored aqueous gel.



Supplied in 5 Types

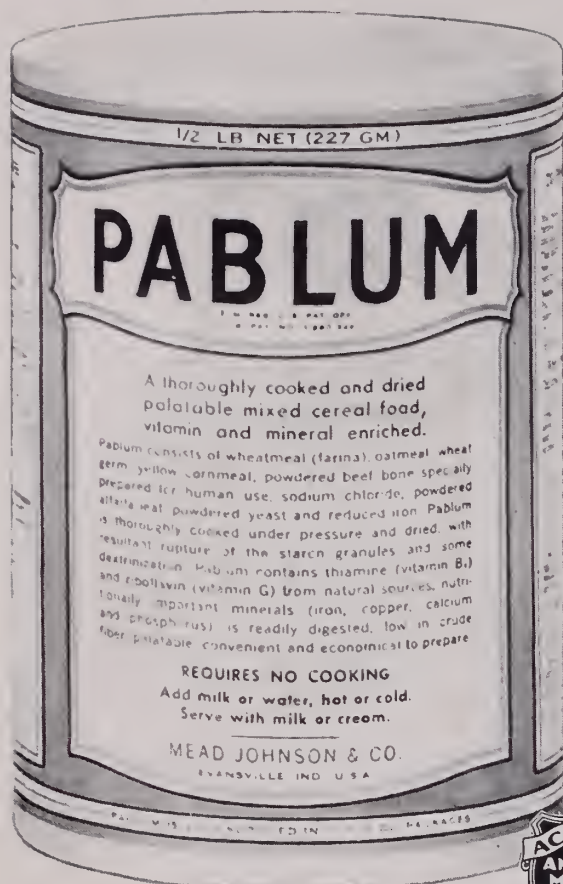
Petrogalar Laboratories, Inc.
Chicago, Illinois

Petrogalar*

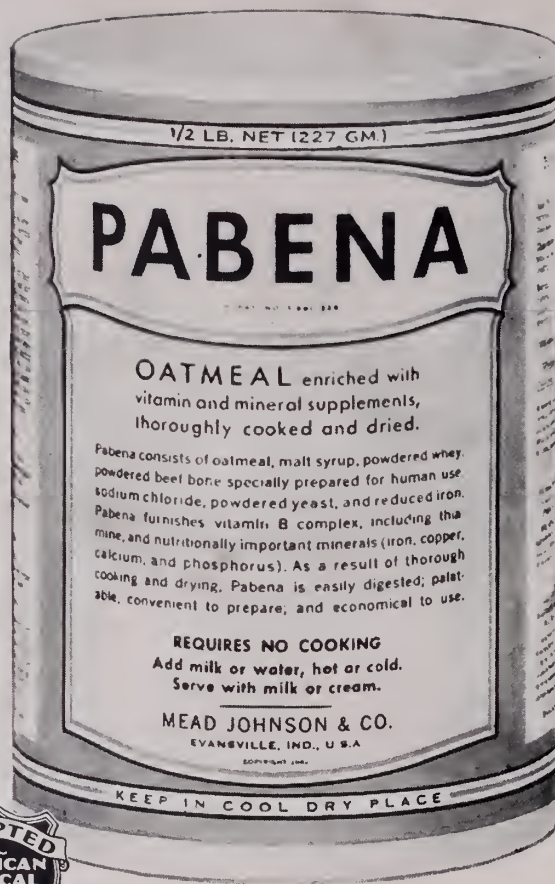
Promotes "Habit-Time" of Bowel Movement

1932

1942



8 oz.—1 lb. 2 oz.



8 oz. only

PABLUM, the pioneer precooked fortified infant cereal, now has a companion-product: Pabena is a precooked oatmeal cereal, lending variety to the infant's diet and offering the nutritional and convenient features of Pablum.

BOTH continue to be marketed and advertised only to the medical profession. Samples available on physicians' requests.

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